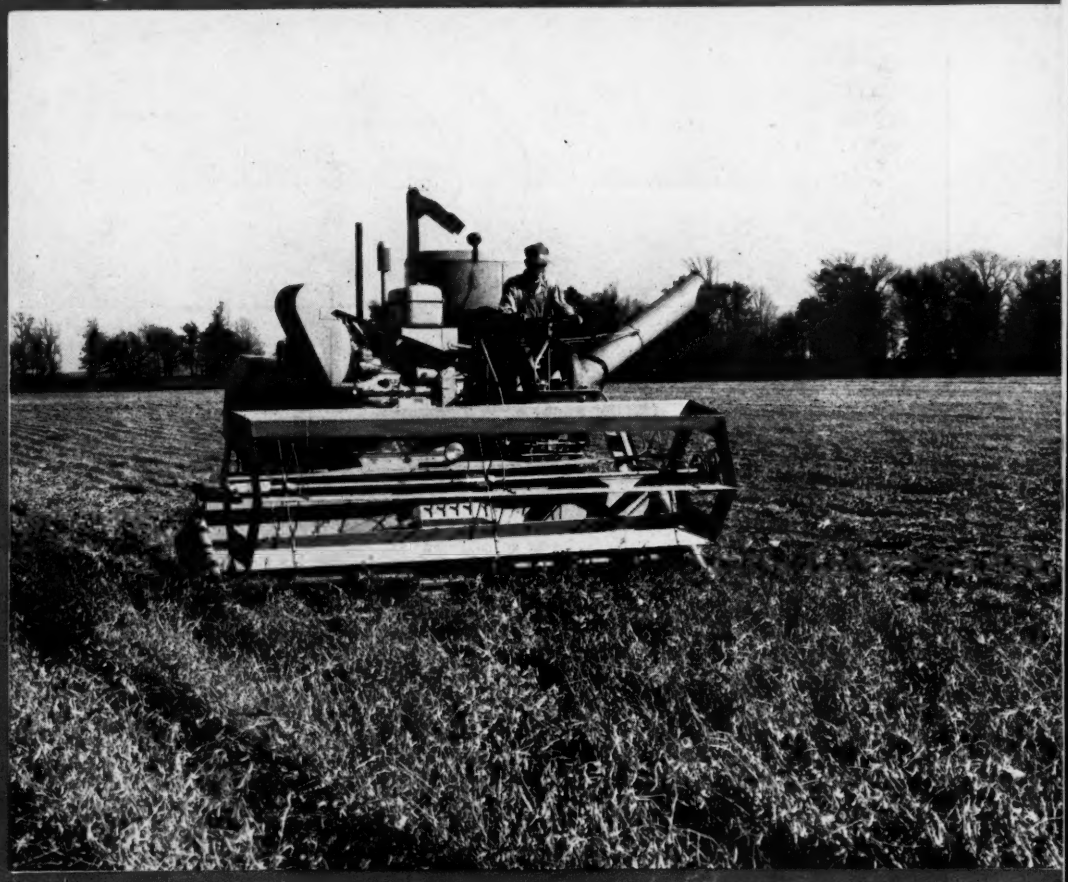
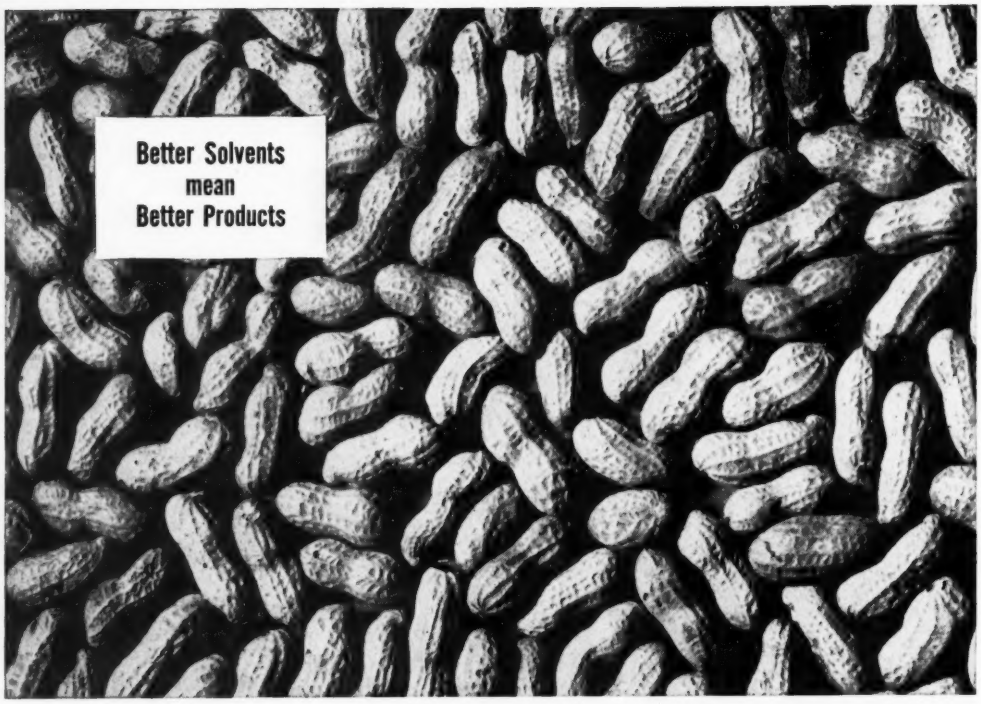
THE Soybean Digest



Official Publication

AMERICAN SOYBEAN ASSOCIATION

VOLUME 11 • NUMBER 11 SEPTEMBER • 1951



They look alike—but...

SKELLYSOLVE FOR ANIMAL AND VEGETABLE OIL EXTRACTION

Applications

SKELLYSOLVE B. Making edible oils and meals from soybeans, corn germs, cocoanuts, peanuts, cottonseed and the like.

SKELLYSOLVE C. Making both edible and inedible oils and meals, particularly where lower volatility than that of Skellysolve B is desired because of warm condenser water.

SKELLYSOLVE D. Quality solvent at competitive prices. For degreasing meat scraps, extracting oil-saturated fuller's earth, general extraction uses.

SKELLYSOLVE F. Extracting cottonseed meals and other products in laboratory analytical work. Originally made to conform to A.O.C.S. specifications for petroleum ether, and for pharmaceutical extractions where finest quality solvent is desired.

SKELLYSOLVE H. Making edible and inedible oils and meals where greater volatility is desired than that of Skellysolve C or D.

"DOC" MacGEE SAYS: At first glance, all peanuts look alike. But inside they're not. Same way with solvents. There are important differences . . . so it pays to be *sure* of your source of supply!

Shipment after shipment, you can be sure when your solvent is Skellysolve . . . "right on the button" in every important specification.

Skellysolve "checks" on close boiling ranges . . . low order of toxicity . . . sweet odor and low sulphur content. Check it, too, for fast vaporization from oils and meals, for low end points, freedom from greasy residues. And low solvent losses . . . plus the barest minimum of unsaturates and pyrogenic decomposition products. Minimum of excessively volatile compounds, too.

Equally important these days . . . Skellysolve comes to you from a source of proved dependability. A look at the record proves that Skelly Oil Company has the raw materials, the manufacturing capacity and the know-how to ship the goods *when* you want them, and in the volume you want!

Solvent problems? Consult a Skellysolve Technical Fieldman. For more complete information, write today!

SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY,
KANSAS CITY, MISSOURI

THE *Soybean Digest*

REG. U. S. PAT. OFF.

HUDSON, IOWA

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KANSAS SOYA PRODUCTS CO. INC.,

Emporia, Kansas Kansas City, Kansas

SUNFLOWER BRAND

Soybean Oil Meal, 44 & 41%

Solvent and expeller oil.

Phones 3000-01-02 and 3435 Emporia, Kansas

JONES-HETTELSATER CONSTRUCTION CO.

31 YEARS as Designers and Builders

*

FLOUR MILLS

ELEVATORS

*

FEED & SOYBEAN PLANTS

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KANSAS CITY 8, MISSOURI

Newly

Designed

Non-breakable

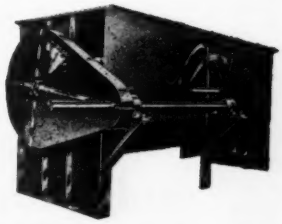
TROUGH ENDS

These trough ends are made of plate steel bodies with inter-changeable and detachable ball or babbitt flange bearings. These trough ends were designed for longer life, quicker, easier and more economical change-overs. On these units only the hub bearing wears out leaving the trough end unharmed. Therefore in your change-overs the price of the hub bearings is only about one half the price of the old solid piece trough ends. Our counter shaft trough ends are of this same design. Shipments on both units can be made from stock. We manufacture a complete line of screw conveyors and accessories and shipments can also be made from stock.

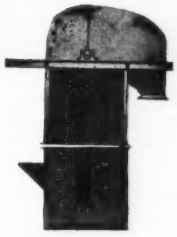
Heavy Duty

BATCH MIXERS

Built to last



Made of all steel, extra heavy duty welded construction. Capacities ranging from 1, 1½ and 2 ton and are made even larger to your individual specifications. Our engineers will be glad to assist you with your mixing problems. Batch mixers manufactured by Industrial are acclaimed by the mixed feed industry, chemical plants, oil and grease manufacturers, food mixers and many other industries throughout the nation as the best Batch mixer they've ever operated. Each and every mixer manufactured in our modern plant is given special care in its fabrication and assembly. This results in better mixtures and better performance.



BUCKET ELEVATORS

Built to your Specifications

All metal elevators complete with head, boot, legging and machinery made to your individual specifications. This is an all metal unit and insures longer wear and dust-tight performance. Head and boot is furnished with shaft mounted on ball or babbitt bearings. Boots come with large slide clean out doors. Furnished with cotton or rubberized belt and high speed cups.

INDUSTRIAL MACHINERY COMPANY

Incorporated

2300 South Main Street Fort Worth 1, Texas

ENGINEERS MANUFACTURERS

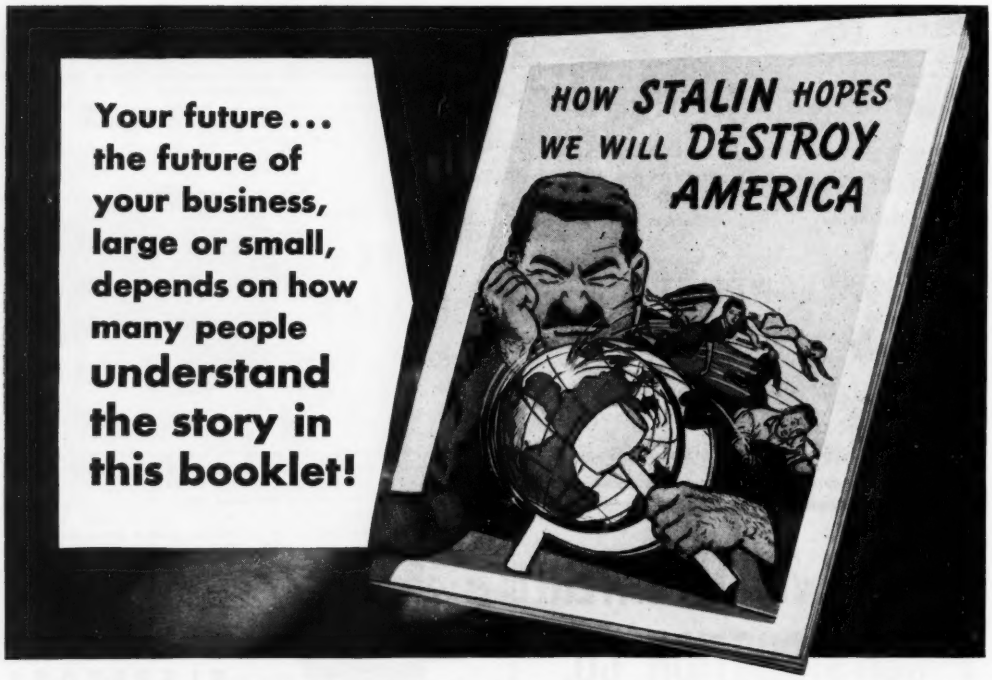
of

Elevating *Hoisting*

Conveying *Mixing*

Equipment

There IS something YOU can do ABOUT INFLATION!


Your future... the future of your business, large or small, depends on how many people understand the story in this booklet!
HOW STALIN HOPES WE WILL DESTROY AMERICA

Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its ***causes*** *and* ***cures.*** *Then we will have gone a long way toward eliminating this pending catastrophe.*

ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

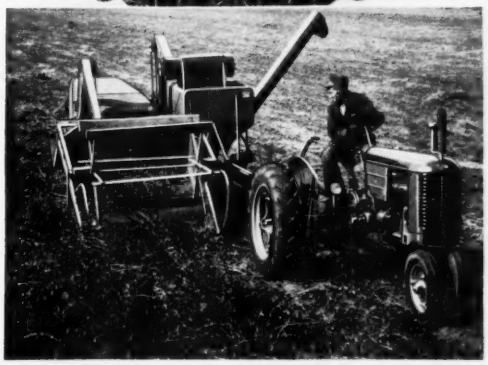
TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it". . . ."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it". . ."In picture form it impresses you more. Most people don't read about it". . ."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

BEMIS BRO. BAG CO.
St. Louis 2, Missouri

FOR EVERY BUSINESS, LARGE OR SMALL: In quantities, it costs only a few cents a copy—$10.00 for 100 copies, down to 3 cents per copy in larger quantities. Single copy free. For full information, write PICTORIAL MEDIA, INC., Attention: Paul Wheeler, 205 E. 42nd ST., NEW YORK 17, N.Y.

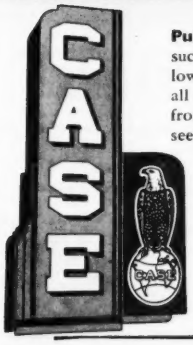
Clean, Whole Soybeans from America's Favorite Combine



Pulled and powered by 2-plow tractors such as the Case "VAC" shown here, the low-cost Model "F-2" Combine harvests all small grains and dozens of other crops from tiny hard-to-get grass and clover seeds to big, fragile beans.

The dollar value of a soybean harvest is enhanced by its freedom from trash and crackage. Soybean producers who use the six-foot Case Model "A" Combine are dollars ahead because their crops come from the combine exceptionally clean and whole, with the highest possible amount delivered to bag or bin.

Case users are more dollars ahead because the Case Model "A" works fast and dependably, with little time out for adjustment and little outlay for repair. Case Combines are built in the 109-year-old Case tradition of making every part a bit better than might seem necessary. That is why Case Combines, like all Case machines, last long with small cost for upkeep. Its ability to do good, fast work at minimum expense and to keep going under difficult conditions has made the Case Model "A" truly America's favorite combine. Write for full information—or see the nearest Case dealer. J. I. Case Co., Dept. J-75, Racine, Wis.



9 AND 12-FOOT CASE COMBINES

Case builds both self-propelled and pull-type combines in these sizes, with choice of rub-bar or spike-tooth cylinders. All feature hydraulic header control, exceptionally seed-tight construction, long straw rack and exclusive Case "air-lift" cleaning.

Again GANO *Specifies* COLUMBIAN for Dependable Low-Cost Storage!

* Gravity system of grain handling is one of the many features incorporated in the design below which materially reduces cost of operation.

The all-steel elevator at Cunningham, Kansas, as shown at right, is one of four recently erected by the Gano Grain Corporation. The four bolted steel storage tanks — plus the three tanks with steel hopper bottoms which are over the truck dump pit, and the headhouse were furnished by Columbian. Columbian Storage Tanks were also used for the three other new Gano elevators at Lewis, Kinsley and Doolan, Kansas. The Gano Company has used Columbian Bolted Steel Grain Storage Tanks for many years at their various locations.

Users everywhere invariably specify "COLUMBIAN" when additional storage is needed — or new plants constructed. Because — minimum initial investment, and minimum overhead and maintenance means increased daily profits. Because — additional economy of low-cost erection due to bolted sectional construction.

COLUMBIAN
BOLTED STEEL GRAIN STORAGE TANKS

Columbian Bolted Steel Grain Storage Tanks are ideal for economical storage of all small grain — wheat, corn, oats, barley, soya beans, cotton seed, peanuts, rice, coffee beans, etc. Hundreds are used by all kinds of feed processors. They are safe, fire-proof, weather-tight, rodent-proof. Never crack or crumble — no caulking or patching required. None has ever worn out or been demolished by tornado or cyclone.

EASY WAYS TO ERECT — Detailed, easy-to-understand blue prints for erection are furnished so that tanks may be put up with any kind of labor — or we will provide supervisor for your own men — or a complete Columbian erection crew. Foundation specifications and blue prints are furnished to enable your local concrete contractor to build foundation. WRITE now for complete information and details of our free engineering service.

COLUMBIAN STEEL TANK CO., P. O. Box B-4226, Kansas City, Mo.

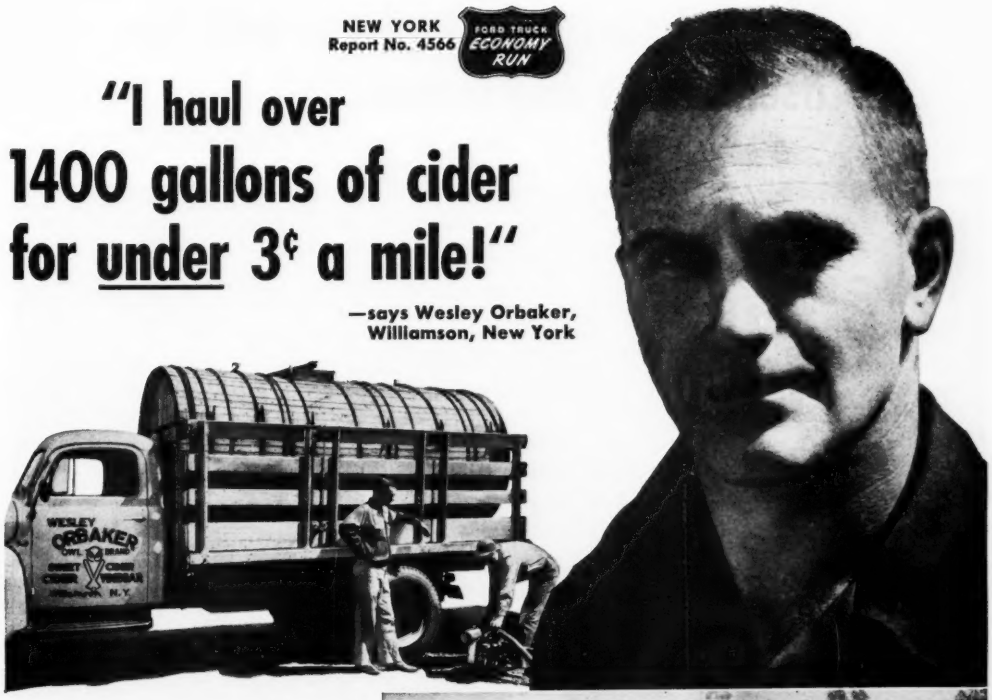
Associate Member of the Grain and Feed Dealers National Association

NEW YORK
Report No. 4566

FORD TRUCK ECONOMY RUN

"I haul over 1400 gallons of cider for under 3¢ a mile!"

—says Wesley Orbaker, Williamson, New York



"You can't beat a Ford Truck for gas, oil and repair economy," says Mr. Orbaker.

Cidermill operator Wesley Orbaker uses 4 Ford Trucks to haul cider, vinegar and juices. Recently he entered one heavy-duty 1950 Ford F-6 equipped with POWER PILOT, in Ford's nationwide Economy Run. He reports:

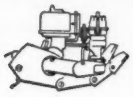
"During the Run I traveled 22,449 miles with loads averaging over 1400 gallons. Yet I spent only $636.86 for gas, oil, maintenance and repairs. That's a thrifty running cost of only 2.84 cents a mile."

Like others who rely on Ford for low running costs, Mr. Orbaker is sold on the money-saving service he got from his Ford Dealer. For more facts on the trucks that last longer *and* save you money every mile—mail attached coupon.

This light-duty 6½ ft. Ford Stake for '51 is built for "Monday hauling" and for "Sunday calling"! Body has sturdy wood floor. Gearshift lever is up on steering column. Cab rear window is 3½ ft. wide, provides 50% more rear visibility. Removable hardwood stake racks make loading easy. Two fine cabs, the 5-STAR and, at added cost, the 5-STAR EXTRA give greater driving ease and efficiency. Ford builds over 180 different truck models. V-8 or 6 engines.

Availability of equipment, accessories and trim as illustrated is dependent on material supply conditions.

POWER PILOT HELPS GROWERS HOLD DOWN HAULING COSTS.



The Ford Truck Power Pilot is a simpler, fully proven way of getting the most power from the least gas. It is designed to synchronize firing *twice* as accurately. You can use regular gas . . . you get no-knock performance. Only Ford in the low-price field gives you Power Pilot Economy.

FORD TRUCKING COSTS LESS

because—FORD TRUCKS LAST LONGER!

Using latest registration data on 7,318,000 trucks, life insurance experts prove Ford Trucks last longer!

See "Ford Festival" starring James Melton on NBC-TV

MAIL THIS COUPON TODAY

FORD Division of FORD MOTOR COMPANY
3299 Schaefer Rd., Dearborn, Mich.

Send me without charge or obligation, detail specifications on Ford Trucks for 1951.

Full Line ☐ **Heavy-Duty Models** ☐
Light Models ☐ **Extra Heavy-Duty Models** ☐

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(Please print plainly)

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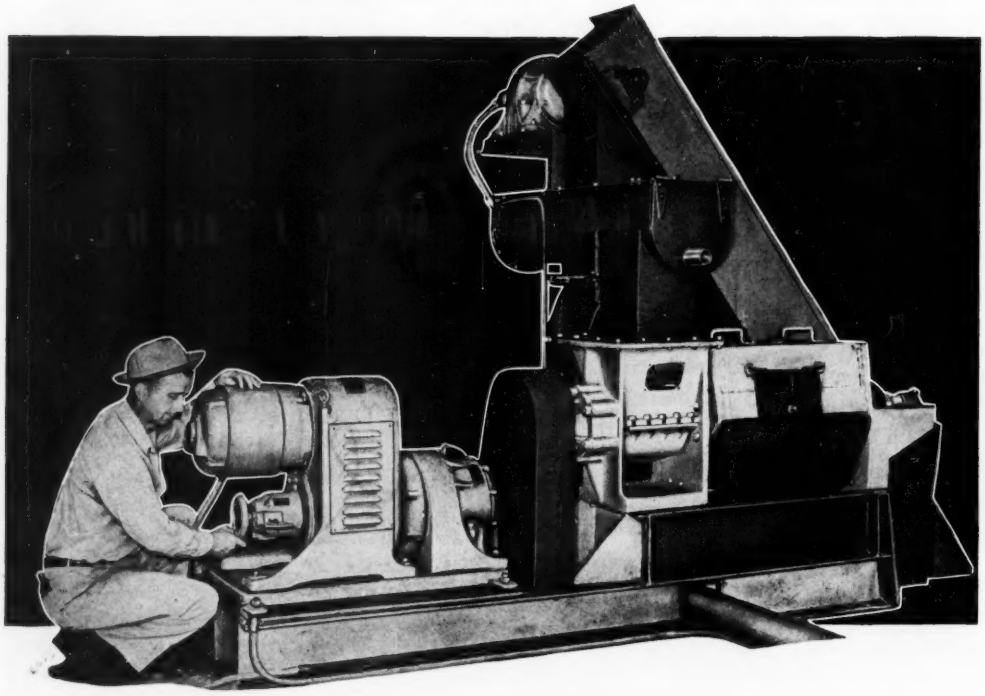
City_____ Zone____ State____

Check here if student ☐

This Enterprise Foots Press paid for itself in just one season...



...plus a $13,050 Profit

The Enterprise PF-7 Foots Press is one of the most important innovations in the vegetable oil processing industry in many years. Installations of this specially designed and engineered equipment have proved remarkable savings in two ways: it substantially reduces foots oil content, bringing it from 50 to 60% down to approximately 15%; and it also increases tonnages by 6 to 8% through Expellers or Screw Presses. Increased plant capacity is accomplished at relatively low cost, providing greatly improved operating methods that result in high profit production. Compact and easily installed, the Enterprise Foots Press is readily adaptable to cottonseed, flaxseed or soybean plants. Write for full information today, or call your nearest Enterprise Process Machinery office.

Enterprise Process Machinery

ENTERPRISE ENGINE & MACHINERY CO.
A Subsidiary of General Metals Corporation
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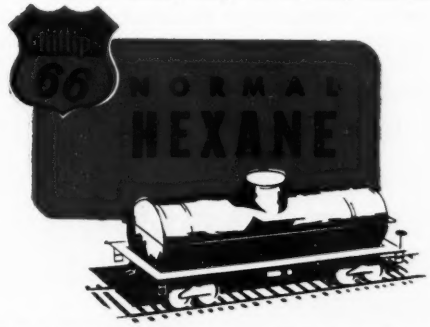
Offices in Principal Cities

Speaking of Exacting Specifications..

YOU BE THE JUDGE! See how Phillips *66* Normal Hexane meets every exacting requirement for a prize-winning solvent!

Narrow boiling range? 5° is pretty near perfect! No light ends to lose, either, and definitely no heavy residue! This pure, colorless solvent imparts no taste or odor to your product.



Because of Phillips strict "product control" and high standards you get dependability and uniformity . . . every time. That means fewer adjustments to make in your plant, fewer operational headaches!

Consult us about your solvent requirements and let us send you complete information about Phillips *66* Solvents for soybean, cottonseed, flaxseed, tung nut, rice bran, corn germ, castor bean, alfalfa, animal fat and other extraction industries.

PHILLIPS PETROLEUM COMPANY

BARTLESVILLE, OKLAHOMA

"... and what's wrong with a farmer making a profit?"

When farmer Huck Woodward asked that question at one of our "bull sessions" in front of the Bank, you should have seen the look on their faces.

"What most of you guys don't realize," he continued quietly, "is that we farmers are in *business* just as much as the Bank here is. There's not a farmer in this county who doesn't hope to have money left over for *himself* after he sells his livestock or crops and pays his bills. He may not think of it as a *profit*, but that's what it is: It's his reward for hard work and the risks he's taken. Any farmer who can invest his land, equipment and sweat in such a way as to make a profit is certainly entitled to it."

Huck's serious blue eyes looked directly at young George Gregory as he said, "Here in America we have freedom: Freedom to succeed, freedom to fail. Profits are the reward of the man who succeeds. Under this system, a few people *do* fail; yet so many more *succeed* that we now enjoy a standard of living envied secretly by the whole civilized world—even advocates of Socialism and Communism. Nevertheless, a tiny minority of our own people would have us surrender our precious freedom in favor of government control of business and agriculture. Regulation by regulation, control by control, they would break the spirit of the men who have made America bountiful: Men bold enough to risk a *loss* in the hope that they may make a profit.

"Let us be on guard."

CARGILL
SPECIALISTS IN SERVING *Agriculture*

OFFICES IN MINNEAPOLIS AND 35 OTHER CITIES

This Advertisement also appears in The Farmer, The Dakota Farmer and 9 other publications.

MEMPHIS

SOYBEAN OIL MEAL AND COTTONSEED MEAL FUTURES MARKETS

Provide Complete Hedging and Trading Facilities for All Producers, Processors and Handlers of Soybean Oil Meal and Cottonseed Meal

—✶—

FOR INFORMATION
Contact Memphis Brokers or Dealers
or Your Nearest Commission House

—✶—

MEMPHIS MERCHANTS EXCHANGE
MEMPHIS, TENN.

ACTIVITIES OF YOUR ASSOCIATION

Missouri Meetings

Four soybean grading schools jointly sponsored by the University of Missouri and the American Soybean Association for the soybean producing areas of eastern Missouri were held Aug. 14-18.

Meetings were held at Canton, Mexico, Sikeston and Malden and were attended by about 75 soybean buyers.

J. M. Ragsdale, extension economist and marketing specialist of the University of Missouri, was in charge of the meetings.

On the program were:

W. B. Combs, of the grain grading branch of Production and Marketing Administration, Chicago, Ill., who was in charge of the grading demonstration.

Paul C. Hughes, field service director of the American Soybean Association, Hudson, Iowa, who warned that the refusal of U. S. growers and handlers to produce quality beans is ruining our export market.

W. J. Murphy, crops specialist of the University of Missouri, who discussed adapted varieties.

Iowa Margarine

Sale of colored margarine in Iowa is illegal under the state's present laws, the attorney general's office ruled Aug. 2.

The ruling was in answer to a request for one by the American Soybean Association. The Association contended in a memorandum submitted to the attorney general's office that:

1—Iowa statutes prohibiting the manufacture and sale of colored "imitation butter" do not apply to margarine, and

2—Even if the statutes do apply to margarine they merely prohibit the manufacture of yellow margarine within the state, and not its sale.

The request was the first step the Association has taken in a campaign to release margarine from legal bondage in Iowa. At present Iowa is one of only nine states where there is still any question about the legality of the manufacture and sale of yellow margarine.

The Association memorandum referred to section 190.6 of the Iowa code, annotated, as follows: "No imitation butter shall be colored with any substance and no such imitation product shall be made by mixing animal fats, vegetable oils or other substances for the purpose or with the effect of imparting to the mixture the color of yellow butter."

The Association contended, "The whole issue turns upon whether the word 'colored' is used as an adjective or as a verb." The memorandum insisted that the word is a verb, therefore "only prohibits the manufacture of yellow margarine in the state" and not the sale of yellow margarine manufactured outside of Iowa.

The Association also cited Florida and Alabama court rulings to the effect that state laws covering "imitation butter" do not apply to margarine.

The attorney general's office ruled that margarine is imitation butter under Iowa law. It stated that ASA's construction would place the provisions of that section of the law in jeopardy from a constitutional standpoint, and would "clearly do violence to the legislative intent," which was to protect the buying public from fraud.

In Mississippi

Problems in the grading and marketing of soybeans were discussed at a recent meeting at the Delta Branch Experiment Station at Stoneville, Miss.

The meeting was sponsored by the Delta Council in cooperation with the grain branch of the U. S. Department of Agriculture and the Delta Branch Experiment Station. H. H. Huddleston, Lamont, Miss., director of the American Soybean Association, represented the Association at the meeting.

The development of a complete grading service for the area was emphasized.

Careful Combining Saves All the Beans.

On this year's big Soy-Bean Acreage

Unique, swing hitch shown here optional equipment.

You'll do a better job of harvesting with a

MASSEY-HARRIS CLIPPER

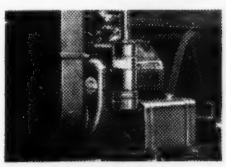
With its straight-through separation, 5-foot rasp bar cylinder, balanced separation, adjustable cutter-bar height 1-½" to 33 inches, 25 bushel grain tank, and higher elevator, the Massey-Harris Clipper makes quick, easy work of your soybean harvesting . . . saves both time and money. You'll do better work . . . and you'll get more beans out of the fields.

There's less shattering of pods at the header, less cracking of beans at the cylinder, more efficient handling of stalks on the straw rack, more premium quality beans in the bin.

For all-round harvesting ability, the Massey-Harris Clipper has earned a high reputation. It has proved to be a seed-saver and grain-getter in more than 110 different crops. It can handle every threshable crop on your farm—and increase your harvest yields. Stop in and see your Massey-Harris dealer. The Massey-Harris Company, Racine, Wisconsin.

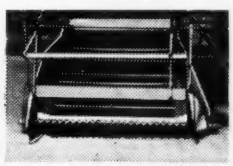
Make it a Massey-Harris

MASSEY M-H HARRIS



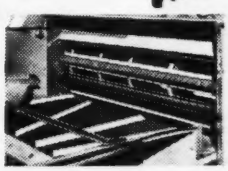
P. T. O. OR ENGINE DRIVEN

Massey-Harris Clipper Combines are equipped for either Power Take Off or auxiliary Engine Drive. Economical! Dependable! Efficient!



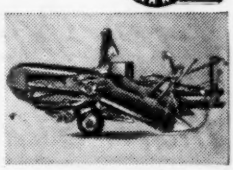
FULL-WIDTH CUTTER-BAR

Wide cutter-bar has extra-low adjustment for getting short or low-growing seeds, down or tangled grain, soy beans. Hand adjustable reel.



RASP BAR CYLINDER

From the rubberized canvas, the crop moves to the rasp bar cylinder that *rubs* out grain the natural, easy way. Concaves are fully adjustable.



CHOICE OF TWO SIZES

Both the 6- and 7-foot Clippers give you the *original* Massey-Harris full-width, straight-through separation that puts more grain in the tank at lower cost.

With Esso Hexane multi-storage availability is assured too!

STORAGE FACILITIES and WATER TERMINALS in industrial centers give added convenience to the users of Esso Hexane. Shipments are made to meet users' requirements . . . by tank cars, tank trucks or drums. Specify Esso Hexane for dependable, convenient delivery right to your door!

You get all 6 of these important features with Esso Hexane

1. **MULTI-STORAGE AVAILABILITY** — water terminals in industrial centers.

2. **UNIFORMITY** — made in modern refineries from carefully selected crude oil sources.

3. **HIGH OIL RECOVERY** — results from "balanced solvency." Recovered oil has good color and refining properties.

4. **EFFICIENT SOLVENT RECOVERY** — narrow boiling range allows complete removal from extracted oil and meal.

5. **PURITY** — high purity helps prevent non-recoverable residues. Low non-volatile content (specification limits non-volatile content to 28 parts per million maximum).

6. **MODERN HANDLING METHODS** — separate tank storage, pumping lines, tank cars and trucks, are used in all Esso Solvent handling operations.

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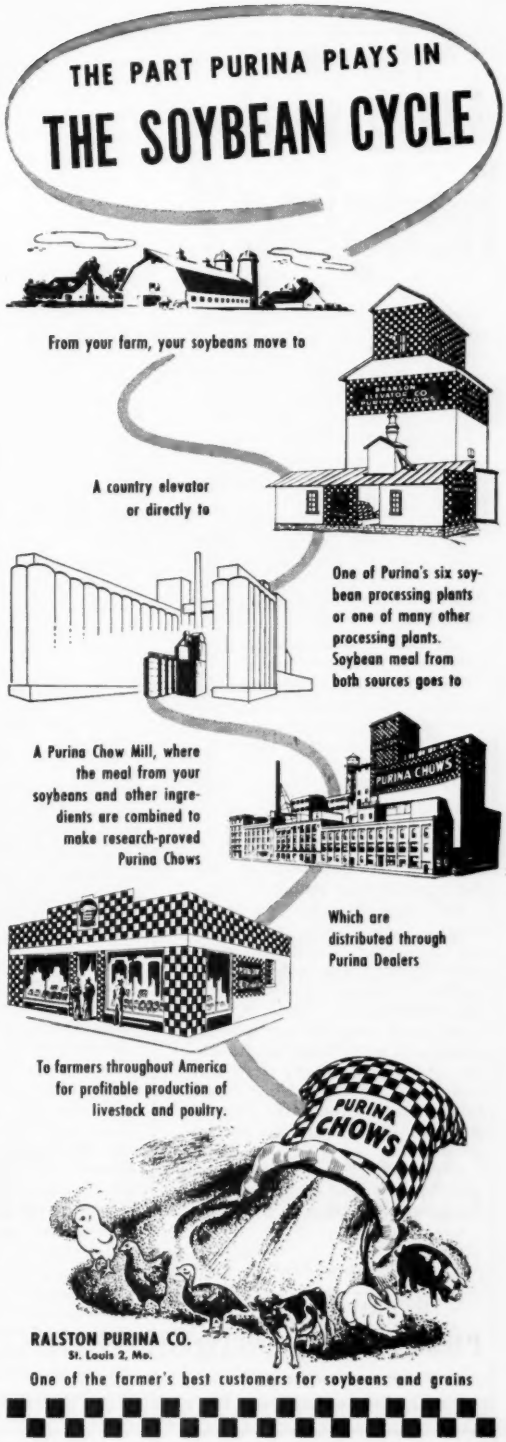
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He explained what futures markets are, how orders are placed, the theory of hedging.

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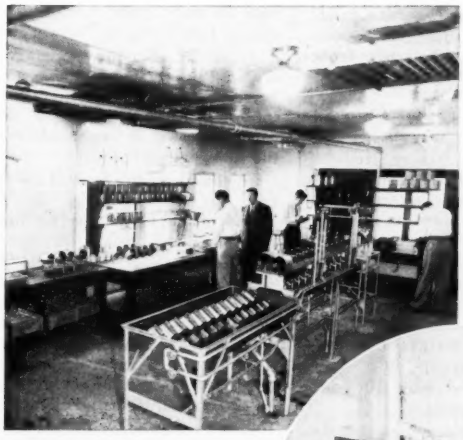
Serving The Soybean Industry



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31st ANNUAL CONVENTION

American Soybean Association

Chester B. Biddle, Biddle Farms, Remington, Ind., was elected president of the American Soybean Association at its 31st annual convention at Des Moines and Ames, Iowa, Sept. 6-8.

Biddle has been on the Association's board of directors for several years, and last year was vice president. He succeeds John W. Evans, Montevideo, Minn., who retires from the presidency after two years of faithful service.

Jake Hartz, Jr., Jacob Hartz Seed Co., Stuttgart, Ark., was elected vice president. Geo. M. Strayer, Hudson, Iowa, was reelected secretary-treasurer. Strayer has been executive officer of the association for the past 11 years.

Newly elected to the board of directors was Albert Dimond, Lovington, Ill., farmer, who was prominent in the recent victorious battle to repeal the Illinois margarine law.

John Dries, Saukville, Wis., retired from the board after 10 years service in that capacity.

Reelected to two-year terms on the board of directors were: Evans, Biddle, Hartz; Ersel Walley, Fort Wayne, Ind.; Howard L. Roach, Plainfield, Iowa; R. H. Peck, River Canard, Ontario, Canada; and C. G. Simcox, Assumption, Ill.

Between 500 and 600 people, including producers, processors, seedsmen, buyers and their wives attended the convention. Twenty-seven states and four foreign countries were represented. And a large group went to Iowa State College for the field day following, which was ably managed by C. R. Weber of the College's farm crops department.

About 250 people attended the annual banquet to see the presentation of honorary life memberships by the new president, Chester Biddle, and hear the lusty, gusty, humorous talk of Col. Jack Major of Paducah, Ky.

Arthur H. Brayton, secretary of the Des Moines Convention Bureau, was toastmaster. The reception before the banquet drew its usual capacity crowd. It was sponsored by the Iowa processors.

The barbeque luncheon at the field day was sponsored by the Des Moines plants of Spencer Kellogg & Sons., Inc., and Swift & Co.

Representatives of various segments of the industry attended a policy meeting for the Association the evening before the convention opened. Such subjects as the ASA field program, exports, processing taxes, soybean grading standards and bread standards, government controls and repeal of the margarine laws in those states where they are still retained were thoroughly discussed.

A considerable number of the firms backing the Association field program had representatives at the courtesy luncheon given by the Association.

The women who attended the convention went on the ladies' day tour that included a visit to the Meredith Publishing Co. plant, the Des Moines

Retiring president John W. Evans: "The careful grower is penalized 5 to 10 cents a bushel under present grain grading standards."

ASA policy meeting: Officers and committee heads listen to suggestions from the floor. Howard L. Roach, Plainfield, Iowa, resolutions committee; Ersel Walley, Fort Wayne, Ind., trade and extension; President John W. Evans, Secretary-Treasurer Geo. M. Strayer and Vice President Chester B. Biddle.

—All photos by Kent Pellett of Soybean Digest except where otherwise specified. Captions read left to right.

Art Center, and a luncheon with Betty Brady, Radio Station WHO commentator.

Mrs. John W. Evans, wife of the president, gave a tea to a group of women at the convention.

The committees whose enthusiasm, long hours and hard work were responsible for the success of the convention were:

Convention: Geo. M. Strayer, Hudson, Iowa, chairman; Howard Roach, Plainfield, Iowa; G. M. Gregory, Dike, Iowa; John Sand, Marcus, Iowa; and C. R. Weber, Ames, Iowa.

Resolutions: Henry I. Cohn, Sr., St. Louis, Mo., chairman; C. G. Simcox, Assumption, Ill.; Ersel Walley, Fort Wayne, Ind.; Robert Peck, River Canard, Ontario, Canada; and Calvin Heilman, Kenton, Ohio.

Nominations: David Wing, Mechanicsburg, Ohio, chairman; Jake Hartz, Sr., Stuttgart, Ark.; and LeRoy Pike, Pontiac, Ill.

Annual Report of the President

There are two important conferences going on in the United States this week. The Peace Treaty conference in San Francisco is one and this convention in Des Moines is the other.

This remark is not facetious. We are all hoping and praying that the Peace Treaty Conference will bring results that will create peace and encourage good relations among all nations. Our convention at Des Moines is one more milestone in the development of the soybean in American agriculture.

Your president is your servant. He has a great many questions come to his attention during a year. Often his decisions vitally affect the welfare of the organization. I assure you it has been a pleasant experience and I appreciate the honor you have bestowed upon me in continuing me as president for two years. My services will be at the command of my successor.

My second year of presidency may seem not to have produced as many definite projects in accomplishment, but our field of activity has widened and programs under way will develop to the benefit of the Association. One specific question that does not show conclusive results in our relations with some governmental bodies. This matter troubles almost every business activity in the nation today. As farmers, we have wanted certain things done and what we could not do easily ourselves we have turned over to the federal government, forgetting that what the government does, it must do in its own way and the government does enjoy retaining its authority.

I think we have fared less badly than some other groups but I assure you it takes poise and careful consideration to exert the proper leadership as the occasions arise.

To date we have not secured adequate representation on the OPS advisory board. Twelve men were appointed, all processors, warehouse operators or traders. Not a single producer, when the law specifies that producers must be represented on all commodity advisory groups. On our protests before the committee's first meeting, we were invited on 20 hours notice to send in one person as a visitor. We are still insisting that as many growers be placed on this committee as appear from any other group.

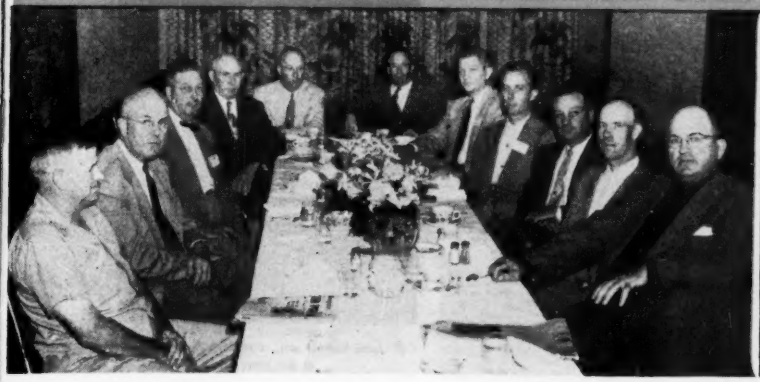
The federal grain grading regulations for soybeans need revision. In my home community I am an officer in our local farmers' elevator association. It is a cooperative with 1,500 stockholders. When I take my wheat, flax and barley to this elevator, each delivery is carefully graded and I receive a price based on the exact percentage of

Above, first to be registered at the convention by ASA business manager Geo. McCulley is E. J. Mayer, Canimpex, jobber of agricultural products, Toronto.

Above, Soybean Digest's R. E. Hutchison, Chicago; Warren W. Winslow, Merrill Lynch, Pierce, Fenner & Beane, Des Moines; and John W. Cripe, Ph. H. Postel Co., Mascoutah, Ill., processor.

Above, pleasant visit by Calvin Heilman, Kenton, Ohio; Hugh Seeburger, St. Charles, Mo.; and R. H. Peck, River Canard, Ontario. Below, notes are compared by Albert Dimond, Lovington, Ill., and E. W. Trischel, Helena, Mo.

Your board of directors: Calvin Heilman, Kenton, Ohio; David G. Wing, Mechanicsburg, Ohio; Howard L. Roach, Plainfield, Iowa; John W. Evans, Montevideo, Minn.; C. G. Simcox, Assumption, Ill.; Chester B. Biddle, Remington, Ind.; Geo. M. Strayer, Hudson, Iowa; Jake Hartz, Jr., Stuttgart, Ark.; Albert Dimond, Lovington, Ill.; R. H. Peck, River Canard, Ontario; LeRoy Pike, Pontiac, Ill. Not present were Ersel Walley, H. I. Cohn, O. H. Acom and H. H. Huddleston.



Pictures taken during the field day. Above is L. M. Humphrey, agronomist for R. L. Dorlch Seed Farms, Scott, Ark., at one of the test plots on Iowa State College agronomy farm.

C. R. Weber (at left), associate professor of farm crops at Iowa State College, makes a point in soybean test plots on agronomy farm during field day. Weber was in charge, assisted by R. R. Kalton and James Crall of farm crops department.

Above, interested group at the soybean test plots. At left are Mr. and Mrs. J. R. McIntosh, Meadville, Mo., producers.

Above, another group at the agronomy farm. In foreground, Jr. Ch. G. G. von Freyburg of Surinam, at convention to learn all he could about soybeans. Below, attentive listeners at swine nutritional research farm. At left is M. W. LeVier, Wichita, Kans., producer.

quality grain. When I take soybeans to this market my load is purchased on a basis of an assumed 3 percent dockage for foreign material. Processors who buy soybeans directly from farmers tell me that the dockage necessary on their soybeans averages 1 percent. This may be a trace of dirt, pods, stems and some harmless pigeon grass.

When this same processor buys carloads of soybeans through commercial channels the foreign material will run 2.9 percent dockage for foreign material. This foreign material will be off-grade grains, sweepings, dirt or sand and often noxious weed seeds. Country elevator managers like to share in this profitable abuse just as much as does the terminal operator. It is a trade practice. The grower of clean soybeans is penalized 5 to 10 cents for every bushel he sells. If he can get these grading rules changed the farmer will have more money to pay dues to the American Soybean Association and make soybean growing more profitable. The grower must likewise put pressure at the local point to secure action on this question.

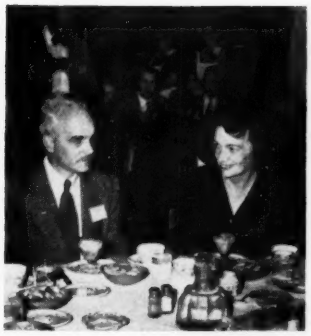
We are having difficulties in holding export markets. We must plan to take care of American industry's needs first. If we are going to keep soybeans from being the prey of speculative forces on the public markets we must maintain ample production. To aid in stabilizing markets with heavy production we need foreign markets to absorb the surplus. We have other questions involving exports and imports of fats and oils, scientific research, legal restrictions on sale of soybean products that give us concern. I am sure that our Secretary will go into more details on these questions.

Please listen carefully to the resolutions offered by your resolutions committee. These resolutions help chart the course of your Association the ensuing year. The demands for service among our membership and trade groups is expanding. Your organization has acquired prestige and it must hold the confidence of the public and our friends. We must also remember that other groups besides ourselves have helped to establish the soybean. I refer to private industry and governmental research and educational activities. The public is becoming soybean-conscious. We need more response from the grower. Our membership should be larger. The state of Iowa alone should give us 6,000 members. It is pleasant to meet in this soybean state. We learn much going from one state to another each year for our conventions. I think sometime it would be nice to go to Canada where the province of Ontario has an expanding soybean industry.

The variety of subjects that came to the attention of your President over the past year's period is very interesting. Inquiries vary from the request for information from a Maharanee in India who is worrying about food supplies for her people, to the kind and cordial interest revealed by Dr. Manuel Gameo of Mexico City, Mexico, when I called upon him in his office last winter. Dr. Gameo is in charge of the Inter-American Indian Institute and he is endeavoring to encourage the production and use of soybeans for the many Indian tribes he serves. Dr. Gameo is a very thorough reader of the Soybean Digest.

While I have been president I have enjoyed the fine fellowship with other members of your board of directors who represent so many different areas. I wish my successor every possible success. In our headquarters at Hudson, Iowa, he will have a fine staff to assist him in his leadership. I assure you that I have been continually aware of the splendid traditions established

Col. Jack Major: wit, wisdom and foolishness at the banquet.



—Photo by Lewis Saboe

Soybean Digest's Mr. and Mrs. Kent Pellett at the annual banquet.

by the founders of the American Soybean Association. We are entering the fourth decade of its existence. Each decade presents necessary changes in programs and methods. May we who are leaders in this decade make the contribution that the organization deserves. My interest in the American Soybean Association shall always be active. Thank you.—JOHN W. EVANS, MONTEVIDEO, MINN.

Report of the Secretary-Treasurer

One year ago in my report to this annual business meeting I called attention to the fact that the theme, "Soybeans Are Worth More Money", was catching on, that people were beginning to believe it, recognize the inherent values that are contained in this crop, and were willing to pay more nearly what the crop was worth.

In the year which has elapsed since that time we have harvested the largest soybean crop in American history—290 million bushels of soybeans. We saw a period of relatively low prices at harvest time, then a period of rising prices followed by the announcement and administration of ceiling prices on our crop. We saw soybean oil selling at prices far above the ceilings which were in effect during World War II, followed by decline. We saw some rather sharp fluctuations in soybean oil meal prices. But we also saw proof of realization by many buyers that "Soybeans Are Worth More Money"!

One year ago I pointed out the necessity of storing a good portion of the soybean crop on the farms and at country points, if there was to be a maximum return to the grower. What happened? There were three good days of soybean trading on the Chicago Board of Trade during the early harvest season. Then soybean prices skidded to levels below price support levels. Immediately the heavy trading stopped. Soybeans started going into bins on the farms and at country points. Buyers began to wonder where that big crop had gone. Well, to make a long story short, it had gone into hiding and it did not come out until prices had climbed to levels nearly $1 per bushel higher than those at which

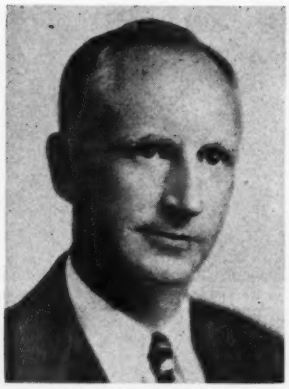
(Continued on page 88)

Chow line at the barbeque on Iowa State College agronomy farm.

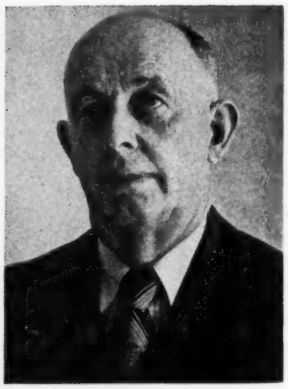
Above, at head table during banquet, Mr. and Mrs. John Dries, Saukville, Wis., and Mr. and Mrs. Geo. M. Strayer, Hudson, Iowa. Dries retired from ASA board of directors after 10 years of loyal service.

Above, four processors at the banquet: Maurice Maze, MFA, Mexico, Mo.; Charles B. Smith, Aloysius I. Reisz and G. B. Kirby, all of Ohio Valley Soybean Cooperative, Henderson, Ky. Below, Howard L. Roach, Plainfield, Iowa, in action with his polaroid camera. L to r around table, Mrs. and Mr. LeRoy Pike, Pontiac, Ill.; Mrs. and Mr. C. G. Simcox, Assumption, Ill.; and Calvin Heilman, Kenton, Ohio. Mrs. Roach and R. H. Peck, River Canard, Ontario, have backs to camera.

—Photo by Lewis Saboe



JAMES W. HAYWARD



FRANK S. GARWOOD

HONORARY LIFE MEMBERS 1951

Frank S. Garwood, Stonington, Ill., and James W. Hayward, Minneapolis, Minn., were chosen honorary life members of the American Soybean Association at its 31st convention in Des Moines, bringing the total number of life members to 16.

Awards were presented at the annual banquet.

Members of the awards committee were: Chester B. Biddle, Remington, Ind., chairman; Jake Hartz, Jr., Stuttgart, Ark.; and J. W. Calland, Fort Wayne, Ind.

James William Hayward

James William Hayward was born near Angola, Ind., in 1898. He received his early education in the local schools and attended high school in Salem Center, Ind. He received his B. S. in agriculture at Purdue University, his M. S. in biology at Notre Dame University, and his Ph. D. in animal nutrition at the University of Wisconsin, the latter in 1935.

Dr. Hayward became an instructor of animal and poultry husbandry at the University of Notre Dame in 1921. In 1925 he was made director of the department of agriculture at Notre Dame, which position he held until 1932 when he entered the University of Wisconsin to pursue studies in animal nutrition.

He became director of the new department of nutritional research of the soybean division of Archer-Daniels-Midland Co. at Milwaukee, Wis., in 1935, and transferred with the department to Minneapolis in 1937, where he now lives.

The name of Jim Hayward has long been intimately connected with soybean oil meal. He did some of the early research on its use as a livestock feed, particularly on the influence of temperature in the processing of the meal. For many years he has been recognized as a leading authority on the use of soybean oil meal in livestock feed.

Dr. Hayward was married to Maude Elizabeth Keefe of Oshkosh, Wis., Dec. 23, 1924. They have three children, John, Mary and Barbara, all living at home.

Dr. Hayward served with the U. S. Army during World War I.

He has long been active in the work of the American Soybean Association, has served on its committees, and many times has appeared as a speaker on its programs.

Frank S. Garwood

Frank S. Garwood, farmer and seedsman, operates over 600 acres of land in Christian County, Ill. A large part of the farm is devoted to growing certified soybean seed and Funk's G-Hybrid seed corn in cooperation with his two sons, Harold and Donald, under the firm name of F. S. Garwood & Sons.

He is a member of the Illinois Crop Improvement Association, and is active in testing new varieties of soybeans, wheat or oats as they develop.

Mr. Garwood was one of a number of progressive farmers who pioneered soybean production in Illinois and were responsible for the rapid progress of the crop. For the first 15 years of soybean production he was one of the most consistent producers of large acreages of soybeans in Illinois, averaging 300 to 600 acres a year.

The first small combine for harvesting soybeans was assembled and put into use on the farm of Frank Garwood in 1924. Before that time soybeans had been harvested as were wheat and oats, with the binder and threshing machine. Mr. Garwood had some difficulty in getting the major machinery firms to see the usefulness of a small combine thresher that farmers could use on soybeans. The Massey-Harris Co. consented to build him one. Farmers and machinery men came from many miles to see if it would work. It did. From then on the combine harvester came into use fast, not only for soybeans but for small grains as well.

Mr. Garwood graduated from the University of Illinois College of Agriculture. He has spent all of his life on the farm. His ancestors came with the original colony that settled in Christian County, Ill., from Stonington, Conn., about 120 years ago. He helped pioneer the establishment of the Farm Bureau and has served on its board as well as the board of the Christian County Farm Supply Co. He was the first president of the Stonington Cooperative Grain Co., a position he now holds.

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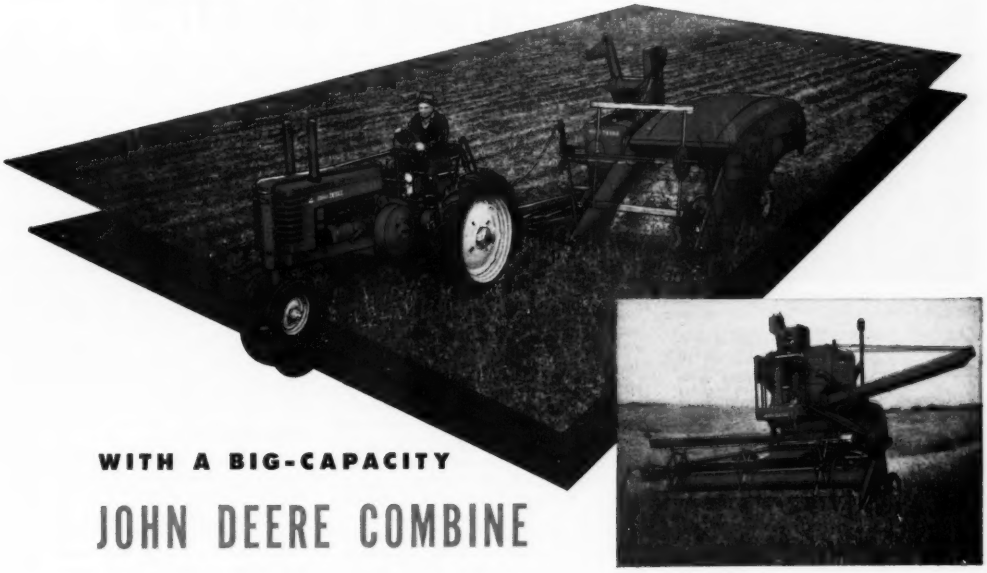

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M. G. WEISS

RESEARCH

More and Better Soybeans through Research

By M. G. WEISS

Principal Agronomist, Division of Forage Crops and Diseases, Bureau of Plant Industry, Beltsville, Md.

DURING 1950 the production of soybeans in the U. S. reached an all time high. Over 15 million acres of soybeans were grown in the U. S. of which 13 million were harvested as beans. Not only was the acreage of soybeans in 1950 the greatest ever planted but the record production of 287 million bushels established an all time high for soybean production in this country.

An examination of the disposition of soybean production within the U. S. may furnish a clue as to potentialities of future soybean production in this country. The map of the U. S. (figure 1) showing acreage of soybeans harvested for beans in 1950 indicates several shifts in production have occurred during the past decade.

Along the northern fringe of the heavy north central production area there has been a notable increase in production along the valleys of the Minnesota River and the Red River to the north. A second area of production which has developed is in southeastern Kansas and west central Missouri. Still a third notable trend is the increase in production in the Mississippi Delta area of the South.

This has been accompanied by an over-all increase in soybean production as an oil crop in the Southeastern and Southern states as far west as Oklahoma. In the latter state production has more than doubled this year in the Arkansas River Valley in the northeastern region of that state.

Improved varieties have greatly increased production in all parts of the Soybean Belt. Further increases in yield may be expected.

Regions of Adaptation

Although soybeans have been grown in the South over a longer period of time than in the North Central states, their use has been mainly for forage and soil improvement. Development of high-oil, yellow-seeded varieties which are suitable for production in the South has greatly stimulated soybean production in this area.

The varieties Ogden and Roanoke are the principal varieties grown in the South for the production of oil. The Ogden variety, developed by the Tennessee Agricultural Experiment Station, was found to have particularly wide adaptation when it was included in the regional soybean tests which were initiated during World War II. The excellent performance of this variety, in both agronomic and compositional characters, has probably been the largest factor in stimulating soybean oil production throughout this belt. The Roanoke variety, slightly later in maturity, has also made a major contribution.

Release of the Wabash variety in 1949 solved many of the production problems throughout southern Illinois, Indiana and Missouri. Besides having high yield and high oil content this variety proved to be resistant to the frog-eye leaf spot disease. Consequently, it rapidly replaced the susceptible varieties, Gibson and Patoka, in the regions where this disease had been severe in 1949.

However, a gap exists between the regions of adaptation of Wabash and Ogden. This gap is currently filled by S-100 which is unsatisfactory because of its moderately low oil content and poor seed quality. Because of the shortcomings of the latter variety, Wabash has replaced S-100 in the northern area of its adaptation thereby narrowing the gap for which no superior variety is available at present.

Throughout the North Central area the varieties Lincoln, Hawkeye and Adams have stimulated production through excellent agronomic performance. Yields of these three varieties are very high. Oil content is also very good.

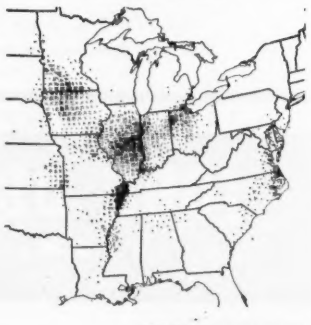
The early varieties, Blackhawk and Monroe, probably represent as great an increase in yield and oil over previously grown varieties as did Ogden in the South. As Blackhawk was not released until this year, its effect has not been noticed in commercial channels. It is predicted, however, that this early variety—extremely lodging resistant like its sister Hawkeye—will do for the northern fringe of the production area what Ogden did for the South. It should stimulate soybean production throughout the southern Minnesota, Wisconsin and eastern South Dakota regions. The effect on oil content will be particularly noticeable as it will be replacing the low-oil variety Habaro to an appreciable degree.

Potentialities

At this time we should probably consider the potentialities of new varieties. We have spoken of the belt in the upper Mississippi Delta area where S-100 is grown and where no improved variety has been released. Several experimental lines have shown promise for this area. Their superiority over S-100 in oil content and seed quality is appreciable. It seems probable that a new variety may be developed to replace S-100 very shortly.

We have mentioned that the release of Wabash narrowed the gap for which no improved variety was available between the North Central and Southern regions. This gap probably will be narrowed further by a variety slightly later than Wabash and which has excellent agronomic and compositional characters. Although this strain is still in the experimental stages, it will be available shortly.

Fig. 1. Acreage of soybeans harvested for beans in the United States in 1950. Each dot represents 5,000 acres.



In summary, we might ask what has been the effect of the development of improved varieties on soybean production? Throughout the heavy producing North Central area the development of varieties superior in yield and oil has undoubtedly contributed to greater production both in increasing acreage and average production per acre. A conservative estimate has been made that the varieties in this area have increased average yield by 20 percent and average oil content by 10 percent over previously grown varieties.

Development of varieties for the south and the northern fringe of the heavy producing area has resulted in still greater percentage increases in yield and oil content over previous varieties. Particularly in these areas is soybean production expected to be stimulated further by new improved varieties.

Cultural Studies

Recent cultural studies have pointed the way toward greater soybean production in areas where soybeans have not been grown extensively until lately. In the North Central area the best cultural practices for maximum production have been well determined and are in general practice.

In other areas where soybeans have recently increased in production due to the event of new varieties, additional cultural investigations are needed. A date of planting experiment which has been conducted at the southern branch of the U. S. Regional Soybean Laboratory in the Mississippi Delta area for the last two years serves as an example. In this area date of planting soybeans varies from early April to late June. Results from the experimental plantings show that more economical production was obtained from soybeans planted after May 1 than those planted earlier. The delayed planting seemed advantageous in several respects. Soybeans planted after May 1 emerged from five to six days after planting whereas 11 days were required for emergence in early April. After emergence the soybeans grew more vigorously and competed more effectively with weeds. As weeds are often a limiting production factor this point is of particular importance. In the May plantings, the plants in the row were 50 percent wider 42 days after emergence than in those planted in early April. Row middles thereby were shaded more rapidly and fewer cultivations were required to control weeds. Yields and height of soybeans planted during the first three weeks of May exceeded those in soybeans planted earlier or later. Bean quality and viability were higher and more uniformity in height and time of blooming was evident in beans planted after May 1. Planting of beans during April resulted in their being thrown into blooming by the short day lengths occurring during that month. This caused irregularity in time of blooming.

Recent row-width studies in Mississippi furnish another example of the importance of research in soybean production. Width of row was studied with particular reference to yield and weed control through shading. Varieties adapted to the South such as Ogden and Roanoke have a much bushier habit of growth than varieties adapted to more northern regions. In the Mississippi Delta, Roanoke planted in 40-inch rows shaded the middle between the rows in the same length of time that it took Wabash and S-100 to shade the middle when grown in 28-inch rows. Effective weed control was thereby established even with the wide rows. Furthermore no increases in yield resulted in planting rows closer than the conventional 36 to 42 inches. Even with the earlier varieties this trend was appreciable. These results are in contrast with several studies in the North Central states where maximum yields were obtained from 21-inch row widths.

Limiting Factors

Diseases are potentially the greatest limiting factor in soybean production in this country. Although, relative to many crops, soybeans are not noted for susceptibility to disease, a recent bibliography of soybean diseases published in the Plant Disease Reporter listed over 500 scientific papers which had been written on diseases attacking soybeans.

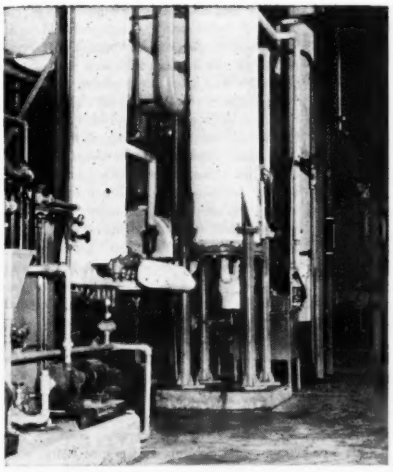
Many disease organisms find soybeans a suitable host when favorable environmental conditions exist. Any one of a number of presently minor diseases may reach epidemic proportions in a favorable season. To illustrate this point, target spot, *Helminthosporium vignicola*, and frog-eye leaf spot, *Cercospora sojina*, became prevalent throughout the South during 1950.

Prior to that season target spot had been a mere curiosity and frog-eye leaf spot had seemed to be confined to the southern Indiana and Illinois area. This year another disease, Phyllosticta leaf spot, made its appearance early in the season and, had it not been for the exceptional lack of rainfall prevalent throughout the South this summer, might have caused severe damage. For several years this disease has been very rare.

Genetic resistance to many of the diseases of soybeans is now available to plant breeders. Resistance to most of these diseases has not been incorporated into agronomically desirable varieties as yet. However, on the basis of present knowledge it seems probable that resistance to bacterial pustule, bacterial blight, wildfire, target spot and frog-eye leaf spot can be transferred to commercial varieties.

Unfortunately, this cannot be said of all diseases. Much more work is needed on the potentially serious diseases such as stem canker, brown stem rot, rhizoctonia and others. Resistance to some of these diseases has not been found in the soybean genus.

With others our knowledge is insufficient even to permit testing of plants for resistance. The most effective means of preventing presently minor diseases from becoming limiting factors in soybean production is to incorporate genetic resistance into commercial varieties. In this manner building up of diseases can be virtually eliminated. Before this objective can be attained, much more research effort must be devoted to a study of the disease organisms and their relationships with soybean strains.



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PHOTOPERIODIC RESPONSES of Soybean Varieties

By M. W. PARKER and H. A. BORTHWICK

Plant Physiologists, Bureau of Plant Industry, Soils and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

FLOWERING OF soybean plants depends very largely on the number of hours of darkness they receive each day. Plants of many varieties are completely incapable of forming flower buds unless they receive 10 or more hours of darkness daily and plants of all varieties flower much more quickly with daily dark periods of 14 to 16 hours than with shorter ones. This reaction of soybeans to daily duration of darkness has been known for a little over 30 years. It was discovered by W. W. Garner and H. A. Allard, two Bureau of Plant Industry scientists, who found that Biloxi soybeans could be made to flower at Arlington, Va., in midsummer if they were subjected daily to short days and long nights. These workers, impressed with the fact that light was acting in some peculiar way to control flowering called the phenomenon "photoperiodism," a term meant to attach special significance to the daily duration of light, i.e., the length of day. This emphasis on the importance of the length of the daily light period continued until about a decade ago, when experiments showed that the daily duration of darkness was the controlling factor.

Soybeans grown with daily photoperiods of 13, 13.5, 14, 14.5 hours from top to bottom. The varieties, Arksoy, Ogden and Volstate, are distributed at random on each truck and thus cannot be individually identified. Planted May 15 and photographed Aug. 11.

Since its discovery our knowledge of photoperiodism has been greatly increased by studies made in various parts of the world. Flowering of many kinds of plants was found to be photoperiodically controlled. Some flowered only when days were short and nights were long. These were called "short-day" plants. Others flowered best with long days and short nights and were, therefore, called "long-day" plants. Still other kinds flowered equally well on all daylengths and were designated as "indeterminate" or "day-neutral". Short-day plants include such well-known crop plants as soybean, strawberry, hemp, millet, sorghum, and chrysanthemum, while spinach, beet, and cereals such as wheat, oats, barley, and rye are representatives of the long-day type. Tomato and many varieties of green beans are typical examples of the indeterminate class. A fourth class contains a limited number of plants that flower only on intermediate daylengths. Sugar cane is an outstanding example of this "intermediate" group.

Practical Applications

Immediately after photoperiodism was discovered many very practical ways were found to make use of it to improve methods of crop production. Plant breeders, for example, were able to make early and late varieties bloom simultaneously as was necessary if crosses between them were made. By artificially controlling the daylength, breeders of some crop plants could produce several generations per year, thus speeding up production of new varieties. Artificial control of daylength for greenhouse-grown crops such as chrysanthemum is now being practiced very extensively and florists are able to produce these flowers every week of the year. It is reported that in Hawaii light is being used in sugar cane fields to keep the plants vegetative so that they will continue to produce new leaves for manufacture of sugar and new joints of cane for its storage. These are only a few of the somewhat spectacular ways in which knowledge of photoperiodism benefits growers of many kinds of plants either directly or indirectly.

Although it seems improbable that the soybean grower will find it profitable to use artificial light on a field basis to control the flowering and fruiting of his crop he benefits from an understanding of photoperiodism in other ways. He cannot escape the fact that he is growing a crop each variety of which has very specific daylength requirements. These daylength requirements are so specific, in fact, that the best performance of some varieties is restricted to zones little more than 50 miles wide in the north and possibly somewhat wider in the south. Although other environmental factors have their effects on development of the crop, daylength is in most cases the dominating one for soybeans.

Differences in the rate of development of early and late plantings of a variety in a particular region result from the photoperiodic reaction. It has been noted, for example, that plants from successive weekly plantings made in the first part of the season may finally bloom almost simultaneously, particularly if they are grown in middle or northern latitudes. In southern latitudes early planted lots may flower prematurely before the short days of spring have lengthened sufficiently. In northern or central latitudes, however, they bloom as soon as the nights increase to a length required for that particular variety. Early planted lots thus have a longer period in which to vegetate than late planted ones. When nights of adequate length are reached plants of the earliest lots are accordingly largest, have the most places at which flowers can be formed, and thus produce the most pods per plant. These facts must be taken into consideration if field conditions make unusually late planting necessary. An increased rate of planting of the variety or selection of another variety having a different photoperiodic requirement may partially counteract this effect of daylength.

Daylength response may conceivably be a factor in the production of seed of forage types of soybeans. Growing of such varieties in latitudes south of those to which they are best adapted as a forage crop results in development of a shorter less vining type of plant that is easier to thresh.

These are only a few of the ways in which the photoperiodic responses of soybeans are used by research workers and commercial growers to produce better vari-

eties and better yields from existing varieties.

Leaf, the Sensitive Part

Although we do not understand fully how photoperiod operates in plants to regulate flowering and fruiting we now know many facts about it that were not available a few years ago. About 1935 it was discovered that daylength treatments must be applied to the leaves of a soybean if the plant is to flower. This was learned by placing only the leaves in darkness in late afternoon and returning them to light the next morning, thus giving them long dark periods but letting all other parts of the plant receive short dark periods. In other lots the stem tips on which the flowers are formed were subjected to long dark periods and the leaves to short ones. Treatment of the stem tips had no effect but treatment of the leaves invariably caused flowering. It was subsequently found that subjection of only one of the leaves of a plant to long dark periods was adequate to cause floral initiation.

Further evidence of the importance of leaves was obtained from grafts between plants of Biloxi and Agate. The Biloxi variety is adapted to conditions in the southern part of the United States and Agate to the northern part. If Biloxi and Agate plants are grown with eight-hour dark periods the Agate plant blooms but the Biloxi does not. A single young leaf of an Agate plant grafted to a petiole of a Biloxi plant enables the Biloxi plant to produce flowers even though grown with eight-hour dark periods. The Agate leaf is apparently able to make some sort of flower-inducing substance, possibly a flowering hormone, that the Biloxi plant is unable to make under those conditions.

Duration of Darkness

Evidence that the length of the dark period controls the photoperiodic reaction has come from two types of experiments. In one the plants have been subjected to cycles of artificial light and darkness that do not total 24 hours. In such experiments short photoperiods have been tested with dark periods of various lengths and long dark periods have been tried with photoperiods of different lengths. Flowers were formed on those lots that received long dark periods regardless of length of photoperiod.

In the other type of experiment plants were given photoperiods and dark periods that were known to be favorable to flowering but in addition they were also given a brief period of light in the middle of the dark period. Thus when Biloxi soybeans were grown with 12 hours of light and 12 hours of darkness per day they promptly flowered but when given the same treatment except for one minute of light added in the middle of each 12-hour dark period flowering did not occur. The great importance of the continuity of the dark period is thus emphasized. A 12-hour dark period each day promotes flowering but two six-hour dark periods separated by a minute of light each day prevent flowering.

Intensity of Light

The soybean is sensitive to exceedingly weak artificial light. An intensity as low as .02 foot-candle maintained throughout the 12-hour "dark period" is sufficient to prevent flowering. This intensity would be given by a 25-watt lamp without a reflector at a distance of about 35 feet. When light is applied for only a minute in the middle of the night its intensity need be only 25 to 50-foot candles to keep the plants from forming flowers.

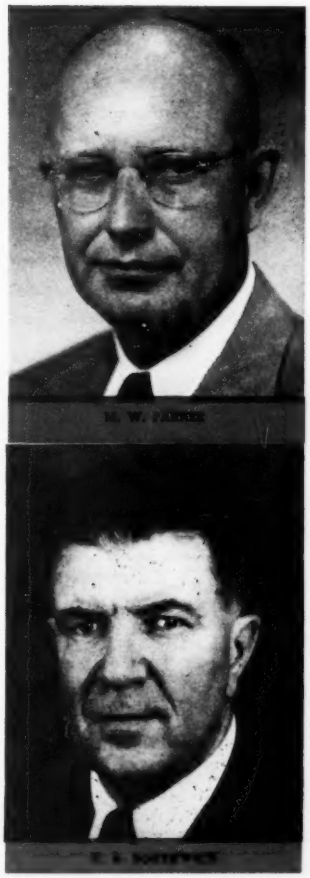
Quality of the light for control of flowering is of great importance, red light being most effective. All visible light is active in preventing flower formation but about 60 times more energy is required in the green than in the red to prevent flowering. Blue is intermediate in effectiveness between red and green. Infrared and ultraviolet appear to have no direct effect on flowering of soybean. Knowledge of the relative effectiveness of different wave lengths of light has been of much importance in giving a better understanding of the nature of the photoperiodic reaction and it has also been of practical use. It tells us that light from ordinary incandescent-filament lamps is ideal for preventing or delaying formation of flower buds, because light from such a source contains a very high percentage of the most effective red wave lengths.

Other Factors

The response of soybeans to daylengths suitable for flowering may be influenced by other environmental factors. Low temperatures, for example, may prevent flower bud formation even though the photoperiodic conditions are favorable. Temperatures of 50° to 55° F. applied just to the leaves and only during the dark periods prevented flowering. Such temperatures were not nearly low enough, however, to stop growth of the plant. They apparently stopped the flower promoting reactions that normally occur in leaves subjected to adequate dark periods. The effectiveness of the flower promoting reactions at higher temperatures varies somewhat with the temperature, reaching a maximum under experimental conditions in the greenhouse at about 80° F. Variations in mineral nutrition sometimes result in minor differences in flowering response. An excess of nitrogen, for example, may delay flowering slightly in certain varieties. In general, however, effects of environmental factors such as these are much less pronounced than those resulting from variation in photoperiod.

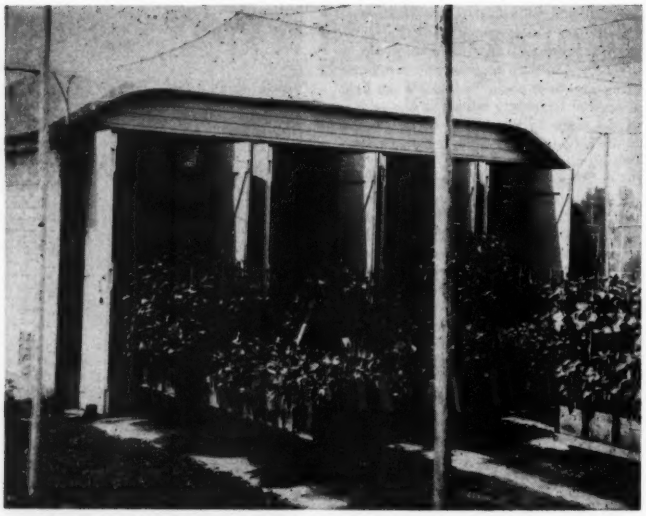
When plantings of soybeans are made at different dates the plants always develop differently because environmental conditions are never identical. Daylength, of course, changes in a given latitude by definite known amounts from day to day but all other factors of the environment that affect soybean growth and development are subject to less precise seasonal variation. In order to evaluate the approximate interrelation of change in daylength and the other fluctuating environmental factors two plantings of soybeans separated by about five weeks were made at Beltsville. The first lot was planted May 15 and the other on June 20.

The varieties selected for this experiment were Macoupin, Arksoy, Ogden, Volstate, Palmetto and Acadian. These include representatives of four of the nine groups



of soybean varieties recognized by soybean agronomists. They have zoned the United States into nine regions and have selected varieties of soybeans especially well adapted to each region. Group 0 is for the region farthest north and Group VIII for the most southern. Macoupin is a representative of Group IV, the earliest type included. Arksoy and Ogden from Group VI, Volstate and Palmetto from Group VII and Acadian, the variety best adapted of the six to extreme southern conditions, from Group VIII.

Lots of plants of each planting were subjected to photoperiods of four different lengths, namely 13, 13.5, 14, and 14.5 hours. These photoperiods were in the range of those encountered in the field at the usual time of planting of most of these varieties. All lots were grown in boxes of soil on trucks so that they could be moved into and out of dark houses as desired. All received 13 hours of natural light daily at the end of which they were placed in the dark house where they immediately received additional light of about 30 foot-candle intensity to complete their respective light treatments. Photoperiod was thus the only factor under control in the experiment.



Part of the equipment used to regulate length of photoperiod for soybean experiment. The photoperiod house is divided into 4 light-tight compartments each having capacity for four trucks of soybeans. Each compartment is equipped with a separate circuit of lights automatically controlled by a time switch.

Temperature, rainfall and possibly other conditions were different for the two times of planting.

Records were taken of the locations of first flower buds, locations of terminal inflorescences, dates of flowering, dates when the oldest fruits were two centimeters long, numbers of pods formed and heights of plants. The data concerning locations of first flower buds and terminal inflorescences are of importance because they give an earlier, and in some respects, a more accurate measure of differences in effectiveness of various conditions on flowering than do dates of bloom, heights of plant or some other records.

A soybean grows at its stem tip, forming a new embryonic leaf and section of stem every two or three days. Associated with the base of each leaf is a bud with a growing tip of its own that is capable of growing and forming new parts the same as the tip of the main stem. So long as the plant receives long days development of new parts proceeds as described, but if it is subjected to short days microscopic flower buds begin to form in certain of these young buds that are in the proper stage of development. Vegetative buds are formed successively from bottom to top of the main stem and its branches. They are always present, therefore, in several stages of formation. If a particular bud has not yet passed a certain very early stage at the time flower-inducing photoperiods are applied it produces one or more flower primordia but if it is slightly further advanced it continues on a vegetative course. If the flower-inducing stimulus of two lots of plants differs the effect will thus be expressed as a difference in the location of the first induced flowers on the main stem and its branches.

Formation of the terminal inflorescence of the main stem and its major branches requires more extensive photoperiodic treatments than are needed to induce formation of the first flower buds on the plant. In this process the terminal meristem ceases to produce embryonic vegetative leaves but forms instead the embryonic bracts of a terminal inflorescence. The total number of vegetative leaves on the plant is thus also controlled by photoperiod and becomes a useful character for comparisons of the flower-inducing effectiveness of different treatments.

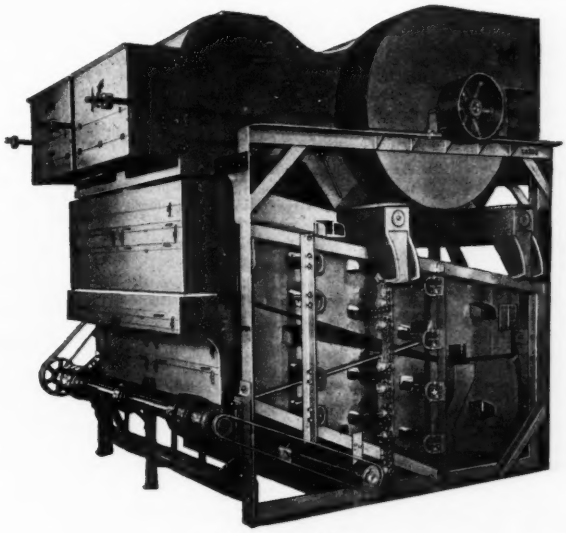
Most soybean varieties, when grown with eight- or nine-hour photoperiods from the time they come up, produce their flowers at node 5 and sometimes at node 4. As length of photoperiod is increased the position of first flowers occurs at progressively higher nodes on the plant. For late varieties this change in position of first flowers resulting from a given increase in day-length is greater than for early ones. Thus at comparable photoperiods, flowers were formed at higher nodes on Acadian, a group VIII variety, than on any other variety included in this experiment (Table 1). Those on Palmetto, a group VII variety, were second highest. Flower buds were formed at a considerably lower node on the other four varieties, representatives from groups IV, VI and VII, and the differences between them were not great on any of the photoperiods tested. At the longest photoperiod used Acadian, the latest variety, failed to flower. The difference in position of the flowers resulting from a given difference in photoperiods varied with the length of photoperiods used. Thus there was little difference in their position on Arksoy plants grown at 13- and at 13.5-hour photoperiods, but a large one occurred between lots grown at 14- and 15-hour photoperiods (Table 1). Results with other varieties were similar to those with Arksoy.

Positions of first flower buds on comparable lots were different for the two planting dates. They were slightly lower on plants at every photoperiod of the June 20 planting of Arksoy, Acadian and Palmetto and at all but one photoperiod for Ogden. With Volstate and Macoupin the relation was exactly opposite, flowers being at a higher position in the June 20 planting than in that of May 15. These varietal differences appear to have significance but they could not be tested statistically because the limitation of material resulted in incomplete sampling.

Although differences occurred in position of flowers on plants of the two plantings the differences were small in most cases relative to those resulting from photoperiod. These differences in response could have resulted from differences in temperature, radiation or other factors and interactions between them. Much wider ranges of temperature or of solar radiation than those encountered during this experiment are incapable by themselves of causing flowering if photoperiods are of length unfavorable to flowering. The effects of these other environmental factors appear to be secondary on the photoperiod reaction itself. In this particular experiment the average weekly minimum temperatures were 5 to 10 degrees lower during the first four weeks for the first planting than for the second. Total solar radiation, measured about 10 miles from the site of the experiment, was higher for the second planting during the first two weeks and lower during the second two weeks.

Data for position of the terminal inflorescence were incomplete for three of the varieties but for the other three the differences were of the same general pattern as those for position of first flowers (Table 1). Since Arksoy, Ogden, and Volstate produced terminal inflorescences on every photoperiod tested they would presumably be classed as determinate soybean varieties. Macoupin, on the other hand might be so classed, when grown with 13- or 13.5-hour photoperiods but at longer ones would be classed as an indeterminate variety. The term "indeterminate" as here used refers specifically to a habit of growth of a soybean variety in which the terminal of the main stem continues to grow throughout the season. It does not relate in any way to the indeterminate photoperiodic response characteristic of plants such as snap bean, tomato and others. Palmetto was determinate on 13-hour photoperiods but not on longer ones. It is not improbable that Acadian might have been determinate had photoperiods shorter than 13 hours been tested.

The average difference in days to flower between all lots planted May 15 and June 20 was six, the June 20 lots blooming in the shorter time in every comparison (Table 2). These differences, like those in positions of flower buds, were small in contrast with those resulting from photoperiod. Average number of days from planting to flowering for both lots on 14-hour photoperiods ranged from 43.6 days for Macoupin to 96.3 for Acadian. When the six vari-



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eties are arranged in order of increasing group number the numbers of days from planting to flowering of the 14.5-hour lots form an increasing series.

The difference in days to flower resulting from the 1.5-hour difference in length of photoperiod of the 13- and 14.5-hour lots varied with variety. For Macoupin, which was least influenced by this range of photoperiods, the difference was 8.4 days and for Acadian, which was most influenced, it was 50.1 days. The size of these differences for the different varieties increased with the group numbers of the varieties.

The effects of photoperiod do not stop with the production of flowers. The rate of development of flowers to young pods is also influenced. In this experiment the number of days in most cases increased as the daylength increased (Table 3). Lots planted on the different dates passed through this stage of their development at different rates, those lots planted June 20 requiring fewer days in every case than those planted May 15. These differences, as in previous cases, were small relative to those resulting from differences in photoperiod. Although data were not collected observations indicated that effects of photoperiod expressed themselves during even later stages of pod formation and maturity.

The average number of pods per plant increased as length of photoperiod increased and in most cases was greater on plants of the first planting than on those of the second. This result was to be expected because the number of pods produced by a plant depends to considerable extent on the stage of development of the plant when it starts to bloom, larger plants having more positions at which pods can be formed.

Height of plant increased for every variety with each increase in photoperiod. This greater height was primarily due to the greater numbers of internodes formed at the longer photoperiod. There was also a height difference between lots of the first planting and those of the second, particularly for varieties Macoupin, Arksoy, Ogden and Volstate. For each of these varieties the number of internodes was about the same at comparable photoperiods for the two plantings. The additional height of the June 20 lots therefore resulted from greater elongation of these internodes and was probably to be attributed to differences in temperature or light prevailing at some stage in the development of the two plantings.

Effects of environmental differences for a few days during the early stages of development may have profound effects that are not fully apparent for several weeks. One replicate of the 13-hour lots accidentally received continuous light for a period of about 10 days ending when the plants were four weeks old. This replicate bloomed 11.2 days later than the correctly timed one and required 8.1 more days to produce pods two centimenters in length. The total delay in production of pods of this size was thus 19.3 days. Corresponding differences in number of pods and in heights of plant were also observed.

Table 1. Effect of photoperiod and time of planting on location of first flower buds and terminal inflorescences of several varieties of soybeans*

Variety	Group number	Planting date	Location of first flower primordia after various photoperiods				Location of terminal inflorescences at various photoperiods			
			13 hours	13.5 hours	14 hours	14.5 hours	13 hours	13.5 hours	14 hours	14.5 hours
Macoupin	IV	May 15	5.0	5.5	7.0	7.6	18.0	18.5		
		June 20	5.8	6.5	7.8	8.1	17.5	18.2		
Arksoy	VI	May 15	6.1	6.2	8.0	9.7	10.5	11.3	13.0	16.7
		June 20	5.8	5.8	6.8	9.0	10.0	10.3	13.0	15.9
Ogden	VI	May 15	6.6	6.8	7.8	8.6	11.1	12.1	12.6	14.9
		June 20	6.1	6.0	7.3	8.7	10.6	10.7	13.1	15.1
Volstate	VII	May 15	5.4	5.7	7.0	9.2	10.3	10.7	12.0	16.7
		June 20	5.8	6.1	7.5	10.0	9.7	10.6	13.2	16.6
Palmetto	VII	May 15	9.0	9.9	12.9	15.0	21.5			
		June 20	8.1	8.9	11.1					
Acadian	VIII	May 15	11.0	11.3	15.0					
		June 20	8.6	10.5						

* Values are averages for 40 plants and indicate nodes from base of plant.

Table 2. Effect of photoperiod and time of planting on the number of days to the opening of first flowers of several soybean varieties.

Variety	Group number	Planting date	Days from planting to opening of first flowers on various photoperiods*			
			13 hours	13.5 hours	14 hours	14.5 hours
Macoupin	IV	May 15	36.6	37.5	42.4	45.4
		June 20	32.8	33.8	37.2	40.9
Arksoy	VI	May 15	38.3	41.1	47.2	56.2
		June 20	30.6	33.4	40.0	50.3
Ogden	VI	May 15	40.5	42.2	46.5	52.0
		June 20	32.5	34.3	40.5	48.1
Volstate	VII	May 15	35.3	37.1	45.6	61.4
		June 20	30.1	32.3	39.3	55.1
Palmetto	VII	May 15	46.3	50.5	64.2	84.2
		June 20	39.5	44.1	61.2	76.8
Acadian	VIII	May 15	49.9	57.2	84.6	104.1
		June 20	42.5	52.7	75.6	88.6

* Average values for 40 plants.

Table 3. Effect of photoperiod and time of planting on length of period from opening of flowers to production of pods 2 centimeters in length.

Variety	Group number	Planting date	Days from opening of flowers to formation of pods 2 centimeters in length at various photoperiods*			
			13 hours	13.5 hours	14 hours	14.5 hours
Macoupin	IV	May 15	12.1	12.6	12.8	21.0
		June 20	8.0	8.4	11.0	15.5
Arksoy	VI	May 15	8.7	8.4	13.4	18.4
		June 20	7.6	7.8	9.2	11.4
Ogden	VI	May 15	10.0	12.0	18.0	22.6
		June 20	8.8	10.5	15.3	13.6
Volstate	VII	May 15	10.1	12.2	22.0	27.4
		June 20	9.1	9.5	19.7	13.0
Palmetto	VII	May 15	11.3	15.3	30.5	18.1
		June 20	9.5	13.4	17.2	
Acadian	VIII	May 15	13.2	20.4	21.1	17.2
		June 20	10.3	11.6	11.3	

* Average values for 40 plants.

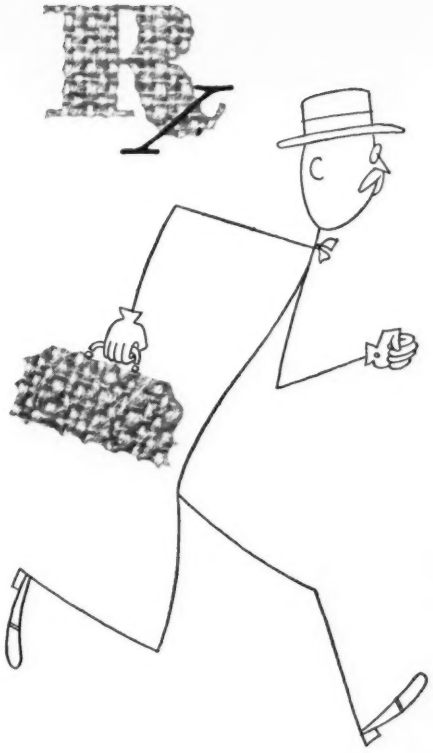
Studies Needed

Although a great deal of photoperiodic work has been done with soybeans much of it has had as its main objective advancement of our knowledge of photoperiodism rather than of the physiology of the soybean. A considerable part of the work was with Biloxi, a variety that is no longer of great commercial importance. Much of it, moreover, has been restricted to studies of the production of flower buds or flowers and has not dealt with possible effects of photoperiod on later stages in the development of the plant. All of this work has been very valuable and has given us a generalized picture of the way soybeans respond to changes in photoperiod. It has fallen far short, however, of giving the soybean investigators the detailed photoperiodic information they should have concerning varieties that are most important to them.

Studies are needed of the photoperiodic responses of many of the varieties that are now in wide commercial use. The six varieties included in the work reported differed greatly in their responsiveness to a given change of photoperiod and it is probable that similar differences would be found among other varieties. Although the six varieties tested included representatives of four different groups wide differences were found between Volstate and Palmetto, two representatives of the same group. Volstate, a group VII variety, responded photoperiodically much more like Macoupin of group IV than like Palmetto of group VII.

Studies are also needed of the interaction of temperature, nutrition and other variables with photoperiod. The relatively few investigations of this type that have been made have been helpful in explaining reversals in relative response of varieties under different soil or temperature conditions.

Finally more should be known about effects of photoperiod on developmental stages following flowering. Time of maturity is dependent in part on time of flowering but it is also dependent on rate of growth and filling of pods. Data presented in this paper show that photoperiod affects these later developmental stages. It is probable that the extent of its influence on development will be found to vary with variety.



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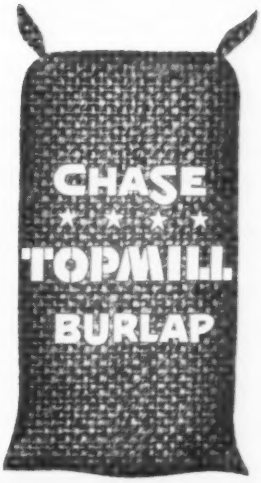

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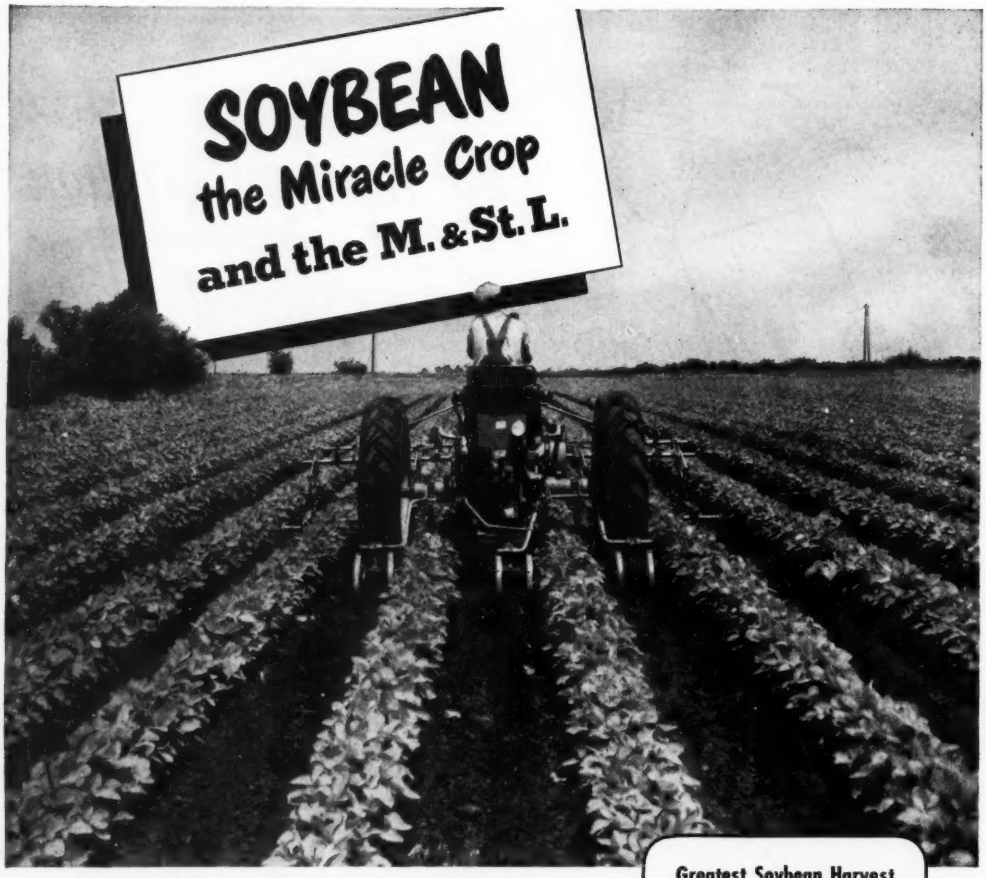

Another record harvest of Soybeans in America seems certain for 1951. Each year, this Miracle Crop wins a more important place as a keystone of agricultural prosperity. Especially is this true in the Great Midwest, where more than half of the nation's Soybeans is grown in four rich farm states served by

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Recent Research Developments on Soybeans at the Northern Regional Research Laboratory

By J. C. COWAN

Northern Regional Research Laboratory†
Peoria, Illinois

J. C. COWAN

During the past 15 months our country has been involved in the Korean conflict. This necessitated some changes in our research. Changes in research goals usually prolong or lengthen the period required to obtain new information and developments. However, the impetus of our past research carried us along so that we do have new accomplishments to report to you. These accomplishments came as a result of our work on flavor stability, soy flour, lecithin, and soybean oil. Much of this work was made possible by funds appropriated as a result of the Research and Marketing Act of 1946. This Act and the funds to support it were established by Congress as a result of support which you, your Association, and others have given to advance American agriculture.

Last year, Dr. Reid T. Milner, the director of our Laboratory, reported on much the same subject which I have for you today: Recent Progress in Soybean Research at the Northern Regional Research Laboratory. Naturally, many of the same subjects on which he reported last year will hold your attention today. You may question our language here, particularly the use of the word "naturally." However, when you remember that the basis of scientific process is the reproducible experiment, it is not too surprising. It is necessary for the researcher to proceed carefully. He must of necessity repeat every experiment he does; perhaps, some uncontrolled factor was responsible for his success or failure. Controlled variables must be studied to determine optimum procedures. This takes time.

What are the basic ingredients in research at the Northern Regional Research Laboratory? They are the basic ingredients in industrial research. They are fundamental or scientific research, development, and invention. These components of technical progress must be harnessed together in a sustained common effort, and the common effort kept headed in the right direction.

Our emphasis or direction in research varies some from the conventional industrial one, but major goals are similar. Fundamental research gives us the basic information which is needed concerning the properties of oils, proteins, carbohydrates, and other products which are grown in the crop each year by the farmer. With the fundamental knowledge concerning our commodities, we can develop processes for converting them into useful items, such as soybeans into salad oil or paint oil, or develop new products.

Some of our developments include inventions which can be patented. Since we work for all Americans, and particularly the farmers, we apply for patents to be assigned to the Secretary of Agriculture.

Flavor Stability

Much of the work which we have carried out on the flavor stability of soybean oil has been fundamental in character. This work has led to some developments and inventions, but much of our work has increased the sum total of available knowledge concerning the problem. Two years ago, I told this same convention some of the details of how we have had to increase our fundamental knowledge of oils and to develop research tools in order to gain new knowledge on this subject which is so vital to the entire soybean oil industry. What are our accomplishments in this problem? First, we have demonstrated by carefully controlled experiments and cooperative effort that taste panels can judge oils objectively and show differences between oil samples. Many concerns in the edible oil industry are now using our procedures. In fact, 12 firms are cooperating with us in further study on this important tool.

Another tool which we developed came as a direct result of fundamental information which we uncovered. We found that metals were vitally important impurities in edible grades of soybean oil. Indeed, as little as 0.1 part per million of iron and 0.01 part per million of copper were found to be enough to reduce the flavor stability of soybean oil. Our analytical and physical chemical division developed an improved method of analyzing metals in oils. With this method, we were able to show, in a survey of commercial oils, that significant amounts of iron and copper were present.

What can be done about these metals? We, and others, have found that many compounds, when added to soybean oil in amounts of 0.01 percent, act as metal inactivators and improve the flavor stability of soybean oil. Now, most of the industry is either using metal inactivators during deodorization of the oil or adding them just afterwards. We believe that metal inactivators should be present during deodorization and afterwards. In their presence, superior results are obtained. Among the new metal inactivators which we have recently investigated and found to improve soybean oil are: Phytic acid, iminodisuccinic acid, and starch phosphate. Another important factor was also firmly established in our survey of commercial oils. Many edible soybean oils cannot be successfully deodorized in iron equipment unless a metal inactivator is used. Furthermore, high vacuum and proper handling is necessary to obtain bland oils. Commercial soybean salad oil of good quality is now being manufactured using metal inactivators and improved deodorization techniques.

Linolenic Acid

Our fundamental studies on the flavor stability of soybean oil have shown that linolenic acid is one major factor involved. A number of investigators have attempted to establish this relationship but none of them were able to give clear-cut evidence to support the theory. However, by some techniques not previously used on this particular problem, we were able to show that the presence of linolenic acid in cottonseed oil made its flavor indistinguishable from soybean oil. What we did was to insert into the cottonseed-oil molecule linolenate and linoleate radicals and let our taste panel tell which sample was cottonseed oil. Soybean and cottonseed oil were identified correctly, and the sample of cottonseed containing linolenic acid radicals was also identified as soybean oil.

Additional work on the autoxidation of linolenic acid has shown that the initial products of the autoxidation are dimers: i.e., compounds in which two molecules of

† One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

linolenic acid have reacted together. However, these dimers are strangers to the ordinary dimers or other oxidation compounds. Although prepared at freezing temperatures, the dimers have a portion of the molecule cleaved off. Apparently, the undesirable flavors from linolenic acid are formed in the very early stages of oxidation.

Recently we have been investigating these volatile oxidative cleavage products or "flavors" from soybean oil and methyl linolenate and have found some new, heretofore-unreported products. Some of the same a,B-unsaturated aldehydes have been found in the flavors from both soybean oil and linolenic acid. I am happy to report that this discovery removes some of the mystery from the scientific aspects of the "reversion" problem.

Work Continues

Our work on the flavor stability of soybean oil is being augmented by additional research at the University of Pittsburgh and the University of Illinois. Both universities have contracts from the Agricultural Research Administration on Research and Marketing funds on parts of the flavor stability problem which are being supervised by the Northern Laboratory. We are working together with them to obtain a better understanding of the problem. The work at Urbana has only just started. They are extending the research on the role of linolenic acid in the stability of soybean oil with particular attention to its polymers. The work at Pittsburgh was reported to you a year ago. Their main efforts this year have been concentrated on isolinoleic acid. This phase of the work has not progressed enough to give you a report on it. However, we are sure that we will soon have interesting information to give you on the flavors derived from this acid. This contract is primarily concerned with shortening since isolinoleic occurs in large quantities in shortening but does not occur in the liquid oil.

Lecithin Modified

Soybean "lecithin" is now well established as a commercial product. It has widespread uses in foods, feeds, and pharmaceuticals. In most products for consumer use, it is a minor constituent. Thus in a wide variety of foods, such as margarine, chocolate, candies, prepared drinks, ice cream; and in industrial products, such as paints, resins, and pigments, it is present to the extent of a few tenths of a percent. In these products, one of its major roles is that of a dispersing agent.

Approximately six months ago, we offered samples of chemically modified soybean lecithin to industry for its investigation of end uses. Many companies asked for samples. A recent request to these same companies for information concerning their interests indicates that this new derivative has possibilities. It is too soon to know if these interests will be maintained sufficiently to bring commercial use. However, the future of lecithin modified with phenyl isocyanate appears promising now.

Our work on phosphatides has also included fundamental work which has led to a partial clarification of the mysteries surrounding the composition of soybean lecithin. Less than five years ago, the trade believed that soybean phosphatides consisted of 65 percent lecithin and 35 percent cephalin. As our studies showed, the phosphatides actually contained approximately 30 percent lecithin, 30 percent cephaline, and 40 percent inositol phosphatides. Again it was necessary to apply new techniques to the problem, but our initial work made an excellent foundation for more work by ourselves and others.

As our knowledge increases concerning the chemical, physical, and biological properties of the individual phosphatide components of commercial soybean lecithin, there is increasing interest in the fractionating and isolation of the individual components. In fact, commercial investigations are following fast upon the heels of recently developed fundamental knowledge concerning the composition and properties of the phosphatides. Pharmaceutical uses in connection with atherosclerosis and the intravenous feeding of fats are currently supplying an impetus to isolate the components.

In anticipation of this trend, work was begun a year ago at the Northern Laboratory to investigate practical commercial solvents and minimal solvent-to-phosphatide ratios for phosphatide separations. This work incidentally has been carried on by Miss Turid Wik of Oslo, Norway, who elected to come to the Northern Regional Research Laboratory to study phosphatides under support of the International Study Grant Program of the American Association of University Women. Isopropyl alcohol has been given the most study of the commercially practicable solvents, and it appears to give useful fractionation. This work is now being brought to a close and will be reported in more detail at a subsequent meeting.

Sugar has been widely blamed for the discoloration and darkening of soybean phosphatides. On the advice of members of the Soybean Council, a fundamental study was instigated on the carbohydrate constituents of soybean lecithin. Through the use of the comparatively new tool of chromatography, three sugars occurring in soybean lecithin have been identified. These sugars, which account for 85 percent of the sugar in soybean lecithin, are "free" sugars, that is, they can be removed by physical methods. Other sugars are found to be combined with the phosphatides and can only be removed by drastic chemical treatment. Practical aspects of this more fundamental work, specifically the relationship of sugars to darkening of soybean lecithin, are underway.

Soy Powder

A year ago we presented some preliminary results from our newly organized baking laboratory. Our over-all objective in this laboratory is to improve the nutritional value of cereal foods by supplementing or enriching the cereal protein with soy protein; a project the nutritionists have recognized for a long time as of high value to a large segment of the population of the United States.

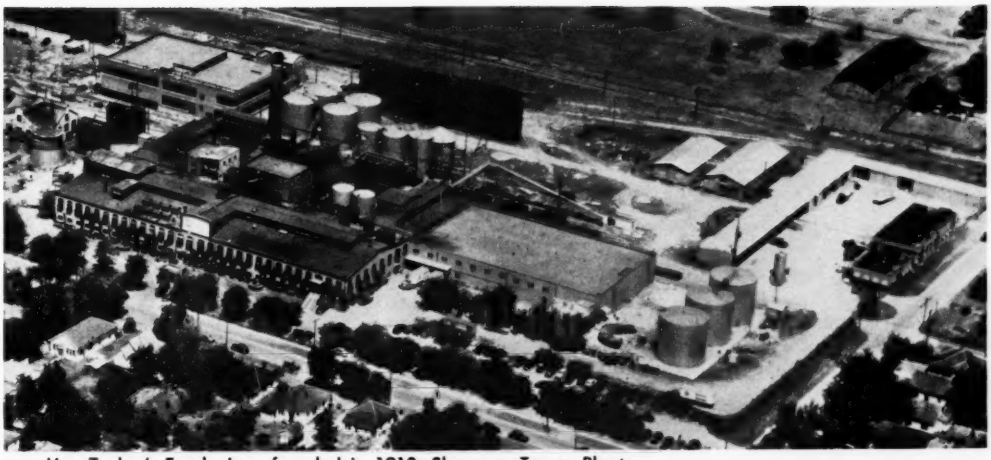
The more immediate objective is to improve the methods of producing and using soy powder (soy flour) so that its combination with wheat flour will make a loaf of bread the public will like and also one the baking industry will find profitable to produce.

You have undoubtedly noted that I have used the term soy powder instead of soy flour. A word of explanation is in order. When the word flour is used in discussions, many of us immediately and naturally think of wheat flour with its gluten. This gluten has the unique ability when made into bread of stretching under gas pressure generated by yeast fermentation and of retaining much of that gas in the loaf. Since soy powder does not contain gluten, it does not have this stretching ability.

In order to reach our objectives for soy powder, there are several technical improvements that need to be made. A survey of the Soy Flour Advisory Committee indicated four improvements of primary importance:

1. Color of bread containing soy powder could be improved.

Some of the speakers at the session on research: J. C. Cowan, Northern Regional Research Laboratory, Peoria, Ill.; Dr. Martin G. Weiss, Bureau of Plant Industry, Beltsville, Md.; and E. A. Buelens, Soya Food Research Council, Chicago, Ill.



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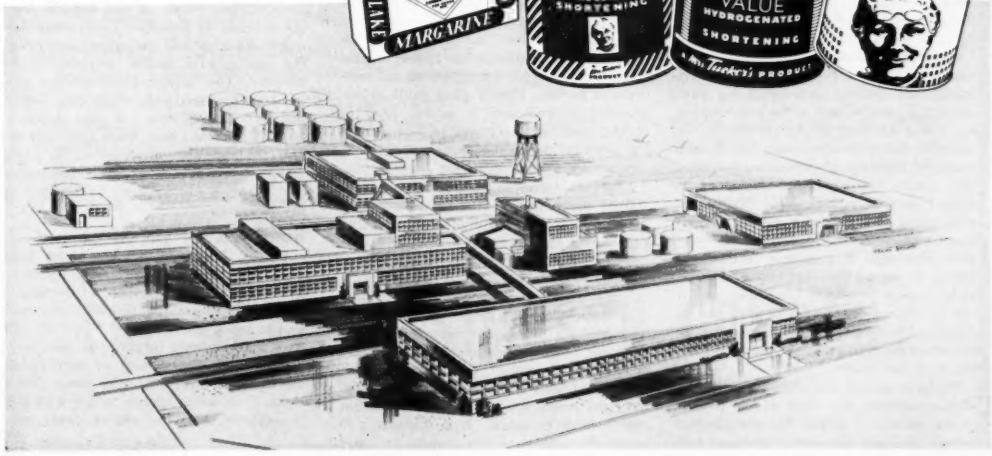
Mrs. Tucker Comes to the Soybean Country

The Mrs. Tucker's Folks, who for 38 years have made fine foods from choice Vegetable Oils, are now building another modern refining and processing plant in Jacksonville, Illinois, so that they may utilize even greater quantities of Soybean Oil from the crushing and extracting plants of the Midwest.

Artist's Drawing of New Mrs. Tucker's Refining and Processing Plant in Jacksonville, Illinois.



At the left are the electrically heated rotary hearth baking oven and the sheeting rolls for uniformly degassing bread doughs. Dr. C. W. Ofelt, chemist, is shown scaling a dough to a definite weight prior to placing it in the pan at lower right and fermenting in the constant temperature-constant humidity cabinets in the background. It is through visual observation and feel of the doughs during such manipulations that the operator must evaluate dough handling characteristics.

2. Flavor and odor of bread containing soy powder could be made more nearly like present bread.

3. Loaf volumes of bread containing soy powder should be equal to basic bread or bread containing dry milk solids.

4. Handling characteristics of dough containing soy powder should be improved to maintain production schedules.

It is quite evident to people who understand baking technology that all four of these factors are important in the modern loaf of bread and to the baking industry. It is an important part of our program to measure as well as we can by experimental baking procedures the magnitude of the above factors and find methods of achieving more perfect loaves.

One phase of our work has been the examination of representative samples of full-fat and fat-free commercial soy powder at a 5 percent level in the bread formula. Using standard baking procedures, the commercial soy powders were baked with optimum amounts of potassium bromate. The results compared with bread made with 4 percent special high quality dry milk solids and also with a basic loaf of bread without dry milk solids or soy powder. This type of work has involved the baking of several thousand loaves of bread under rigidly controlled conditions, and it will be some time before the work can be completed and fully evaluated; however, in the meantime we can report the significant trends of our results.

We have arrived at some definite conclusions concerning the effect of soy powder on loaf volume of bread. The average loaf volume obtained when using 6 percent full-fat soy powder (5 percent on a fat-free basis) supplied by different producers, ranges from no change at all to a reduction of as much as 8 percent. The results are in comparison with either the basic loaf or with bread containing 4 percent non-fat dry milk solids. When the fat-free soy powder is used at a 5 percent level, the average loaf volume was slightly above that for the dry milk solids. In fact, 95 percent of all bread containing the fat-free soy powder had a loaf volume above that containing the dry milk solids. In comparing the soy powder formula with the basic formula (no milk solids or soy powder), the loaf volume changes were very small. For a majority of the loaves, the change was less than 1 percent and none of the soy powders tested caused a loss in loaf volume greater than 3 percent. The results indicate to us that, when a good grade of soy powder is used at a 5 percent level in bread, there is no change in loaf volume of practical significance to the consumer if the proper level of oxidation is used.

Another factor on which we have obtained preliminary results of an encouraging nature are the taste and odor of bread containing the powder at a 5 percent level. The experimental bread has been submitted to our laboratory personnel along with a simple questionnaire asking their opinion on flavor, odor, and color. It is quite apparent from this crude method of testing that few people object to the taste of bread containing 5 percent soy powder, and it further appears that few people can identify the presence or absence of 5 percent soy powder in bread. It is interesting to note that many of our people, in their critical examination of the bread, have reported too much soy powder when there was none present. We have also started experiments on the taste problem under more precisely controlled conditions. We are using the so-called triangle test to determine if our people can distinguish between bread containing 5 percent soy powder from bread with 5 percent milk solids. This test does not require the individual to identify the soy taste but only to distinguish between three different samples of bread. Our tests have not proceeded far enough for any final conclusions. There are several uncontrolled factors in the taste panel work which we have not had time to evaluate and which might be expected to modify the results. Some of these variables are soybean variety, bread formulation, baking method, and method of processing the soy powder.

Our experience shows that dough handling characteristics are greatly modified by the method of processing the soy powder, such as the amount of steam treatment. Besides proper heat treatment, further improvement is affected by use of optimum amounts of potassium bromate. Further work is in progress. The illustration shows one of the steps in the laboratory procedure where dough handling characteristics are evaluated.

Soy Powder for Greece

During the past year we have collaborated with Economic Corporation Administration and Production and Marketing Administration officials on improving the use of soy powder in Greece. The Greek bread, for economic reasons, is made from 90 percent extraction flour, and contains no added sugar, shortening, or improvers. Thus the loaf obtained is highly compact in comparison with our bread. The addition of 5 percent soy powder produces sticky, difficult-to-handle doughs, and reduces the loaf volume of the bread. Our baking laboratory showed that proper use of potassium bromate completely eliminated these objectionable effects and gave a normal loaf of bread. However, the small baking shops of Greece cannot use modern baking procedures such as addition of bromate to their dough. It was decided, with the approval of Economic Cooperation Administration, to add potassium bromate to the soy powder before shipping it to Greece. The bromated soy powder was thoroughly mixed with wheat flour before distribution in Greece. A trial shipment of 1,000 tons has been made and early reports indicate that the addition of potassium bromate to soy powder is improving the reception which Greek bakers give to soy powder.

Road Oil

Finally, I want to tell you about some work that may some day be of direct benefit to you. Large amounts of petroleum are used each year in the oiling of gravel and crushed rock roads. Many of you have probably used such oils on your property, or seen your county or state agents use them on roads. Under many conditions, it is advantageous to use additives to improve the stone wetting characteris-

(Continued on page 47)

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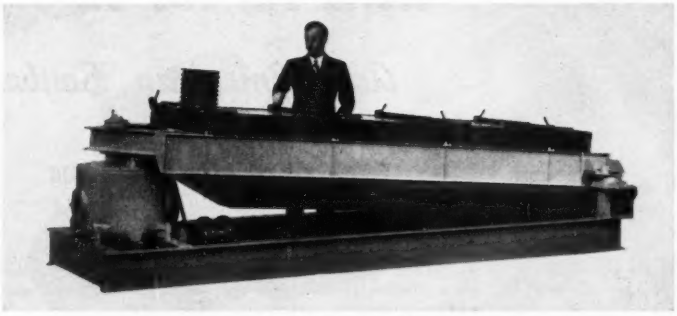

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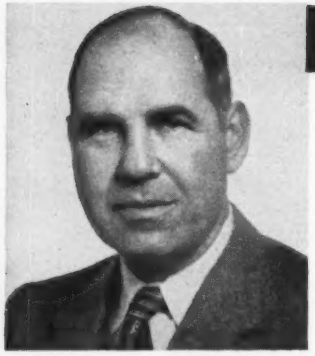

PAUL E. QUINTUS

SOYBEANS ABROAD

World Fat and Oil Supplies

And American Soybeans

By PAUL E. QUINTUS

Head Fats and Oils Division, Office of Foreign Agricultural Relations

IT IS A GENUINE pleasure to be with you today when you begin your 31st annual convention.

What is going on in other parts of the world is of direct concern to us. We may forget that our soybean combines and our modern extraction mills are in direct competition with the native who gathers palm fruit from what we call the wilds of Africa and extracts the oil by the most primitive hand methods.

We estimate the oil equivalent of all fats, oils, and oilseeds produced in the world in 1950 at about 23 million short tons. Although this quantity was slightly higher for the second successive year than the estimated pre-war average of 22.2 million tons, the increase in supplies has not been so rapid as the increase in the world's population. Consequently, the world's per capita supply through 1951 is still below prewar.

Indications are that the oil equivalent of total world production of fats, oils, and oilseeds—including the oilseed and olive crops to be harvested before the close of 1951—will be greater this year than last year. How much greater the output will be is difficult to say at this early date. Nevertheless, it appears that production increases in the principal producing and exporting countries will be sufficiently great to permit a rather substantial increase in the volume of world trade in the calendar year 1952.

I shall try to give you my preliminary views on the over-all situation in very general terms, based on the assumption that the present international situation will prevail. Later I shall try to point up the aspects of special interest to you as producers and exporters of soybeans and soybean oil.

Let's consider some of the principal producing and exporting countries—first of all those in the Western Hemisphere. We begin with the United States. Thanks in large measure to you soybean producers, the United States recently has become a major peace-time exporter of fats and oils. It appears now, in the light of the most recent crop report, that a new high record of fats and oils production is being achieved in the United States for the fourth successive postwar year.

This means that we will be seeking export outlets again in 1952 for large quantities of fats, oils, and oilseeds. Not only will we want to export oilseeds and their products—particularly soybeans and soybean oil, cottonseed oil, and to a lesser degree flaxseed and peanuts—but we shall also want to market abroad large quantities of lard and inedible tallow and greases.

As you know, it was only a few short years ago that the United States was a net importer of fats, oils, and oilseeds. With our greatly expanded production we have been in a position to relieve a critical postwar fat shortage in the world—a shortage which has been caused in a large measure by the sharp declines of Indian peanuts and Manchurian soybeans in the channels of international trade. This is a good point to bear in mind during this discussion and afterwards.

Argentine

Next, let's take a look at Argentina, currently our only major competitor in the Western Hemisphere. The Argentine carryover of all oilseeds and oils—including flaxseed, sunflower seed, cottonseed and peanuts—at the close of this year will be relatively small. This is because large export sales in 1950 sharply reduced accumulated stocks, and that thus far this year large quantities have been exported, chiefly to Western Europe. Although strong efforts have been made by the Argentine government to expand substantially the plantings of flaxseed, it is unlikely—largely because of severe drought—that the harvested acreage will be much greater than the 2 million acres harvested last season. Exports of edible oils in 1952 will depend largely on the outcome of the sunflower seed, cotton and peanut crops, not yet planted. Exports of lard and tallow from Argentina, a poor second to the United States in production, won't cut much ice in competing with United States exports.

Brazil, of course, will continue as a major exporter of oils and oil-bearing materials. But Brazil's exports are generally not directly competitive with ours. They are mostly the kind of oils we import such as castor, oiticica, babassu and tung. She has, however, exported small quantities of soybeans, cottonseed oil, and peanuts and peanut oil, and soybean production may expand to where exports will become substantial.

In Canada, where production of flaxseed this year may be double last year's low level, there will be greater supplies for export, mostly as linseed oil.

Some flaxseed probably will be exported again in 1952 by Mexico. Also, some shelled peanuts, and perhaps a fair tonnage of cottonseed.

Now, let's move on to the Eastern Hemisphere.

Africa

Africa's peanut crop is expected to be considerably better than last year's. This is true for both British and French West Africa. Thus, exports to the United Kingdom and France, primarily, and to other European countries, may be expected to be substantially greater in 1952 than in 1951. Furthermore, it would seem that exports of palm oil and palm kernels from Africa—chiefly Nigeria, the Belgian Congo, Angola, Sierra Leone, and French West Africa—are likely to be larger in 1952 than this year.

A large olive crop this year in the Mediterranean Basin countries will be a boon to Western Europe. Reports from Spain, Italy, and Greece—which together normally account for about two-thirds of the world's output of this oil—indicate the olive crop will be nearly double last year's small harvest.

Europe's major oilseed crop—rapeseed—has continued to expand in Sweden, and may hold its own in France this year. However, acreages in Western Germany and the Netherlands have declined sharply from 1950. With Western Europe importing fully half of its fats and oils, olive oil is the only vegetable oil of major importance in the supply picture. However, animal fats—butter, lard, pork fat, and tallows—are of considerable significance. And it is probable that combined production of these items in 1952 will be above prewar. However, on a per capita basis, domestic animal-fat supplies will still be less than prewar. While production this year of fish oil in northern Europe, primarily Norway, has been unusually good, one cannot fore-

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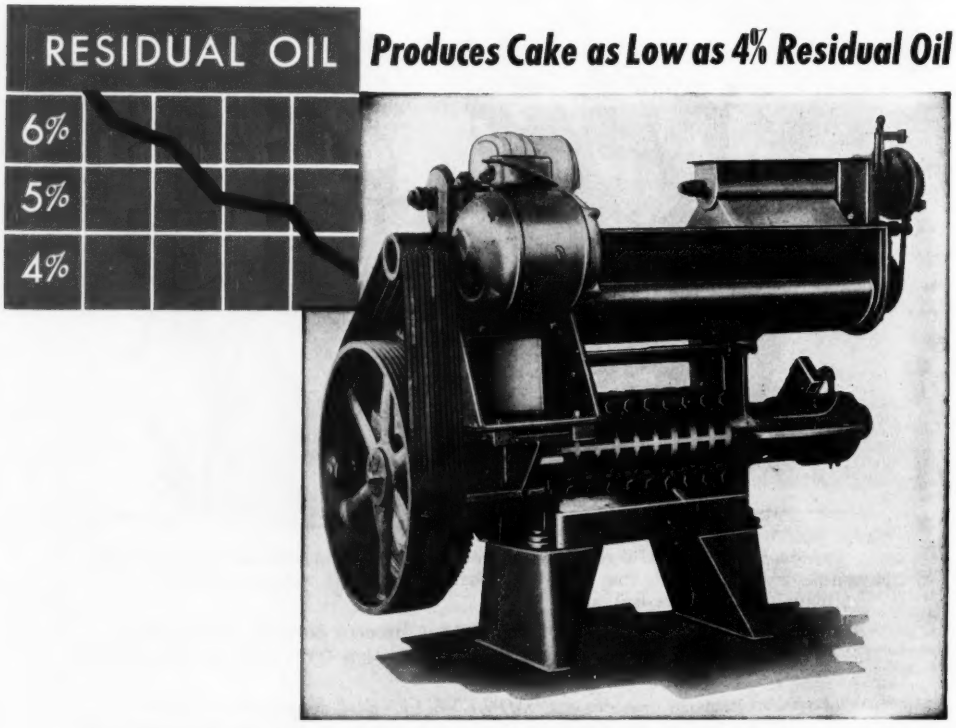

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tell what the coming year will bring. But the output of whale oil from the Antarctic pelagic whale catch—of special importance to West European countries—is not likely to change greatly in the 1951-52 season from the last few years because the catch of baleen whales is limited under the International Whaling Agreement.

What's the story on India?

India, as you know, was at one time the world's leading source of peanuts and castor beans, and a major exporter of flaxseed. While this country—and Pakistan, which only four years ago was separated from India—still produces substantial tonnages of these oilseeds, exports have been sharply reduced by government controls to hold down domestic prices and to increase domestic consumption. It is unlikely that exports of edible oils and oilseeds from India will be any greater in 1952 than in 1951. In fact, for the foreseeable future, we cannot expect India to return to her former role of exporting large quantities to fat-deficit areas.

Ceylon's exports of copra and coconut oil in 1952 may be somewhat less than the tonnage exported in 1951. Exports again probably will be mainly to Continental Europe with smaller quantities to India. We have seen no indications that Ceylon will renew its agreement to sell most of its surplus production to the United Kingdom.

The Philippines, source of roughly half of the oil equivalent of copra and coconut oil moving in international trade, may maintain in 1952 its present tempo of high production and export unless prices fall sharply below current levels, and unless weather conditions in the coming months should be unfavorable.

Exports of copra and coconut oil from Malaya and Indonesia in 1952 could be up some from 1951. Likewise, palm oil. However, developments in these two Far Eastern countries may be influenced by domestic considerations there. On the one hand, increased home consumption is being encouraged. On the other hand there is a tendency for continued civil disturbances and labor unrest which hamper progress in rehabilitating palm plantations in Indonesia.

Finally we come to the Communist area of China and Manchuria. Exports of peanuts from China are beginning to show up in volume and are likely to continue to be of some significance in 1952. While exports of Chinese tung oil to the United States, and other dollar-trading countries, have been embargoed, supplies to other importing countries probably will continue to be available, but in reduced quantity and chiefly through Hong Kong.

Manchurian soybeans, for the first time since the end of World War II, have been exported to Europe in substantial volume in the last 12 months. Assuming that Manchurian production of soybeans is expanding, now that the avenue to Manchuria's prewar outlets have been re-opened, it seems probable that the export volume in 1952 will be considerably larger than in 1951. I have more to say about this later.

Now that we have covered some of the production and surplus supply highlights around the world, let's turn our attention to the deficit aspects. Let's see what the possible foreign market outlets are for surplus supplies of fats and oils, particularly as they affect the United States.

The principal importing areas of the world—as far as fats and oils are concerned—in general are those which are most highly industrialized. Although there are some important exceptions to this generalization, the major market outlets for surplus supplies are North America (including the Caribbean), Western Europe (including the United Kingdom), and to a lesser degree, Japan.

Although the United States has forged to the front in recent years as a major exporter of fats, oils, and oilseeds—mostly edible—we are also a major importer of certain industrial fats and oils, and olive oil. In general, they are items which normally are not produced here, or are not readily interchangeable with our products in surplus supply. In the order of their importance the major source areas for United States imports of fats, oils, and oil-bearing materials are the Philippines, South America, Mediterranean Basin, and Africa.

Coconut Oil

Copra and coconut oil—the major oil imported into the United States—certainly will be brought into this country in large volume again in 1952. As you know, coconut oil is used chiefly by the soap industry. However, it is important also to our defense program as an ingredient in napalm fire bombs.

Palm oil, obtained chiefly from the Belgian Congo in recent years, is a preferred oil in the steel industry. Furthermore, it is a stockpile item. Imports in 1952 probably will approximate the volume brought into this country in the last two or three years. At least I see no reason now why imports of this item should change significantly in 1952.

From our South American neighbors—principally Brazil—we import castor beans and oil, babassu nuts and oil, and oiticica oil. Despite the fact we have initiated this year in the United States a rather ambitious castor seed production program, it is likely that we will import from Brazil in 1952 as much castor beans and oil as we can obtain. Demand for castor oil has expanded greatly under our defense program and is being stockpiled in fairly large quantity.

Imports of babassu kernels and oil, oiticica oil, and tucum kernels may depend largely on availabilities. The United States traditionally has purchased from Brazil the major share of these exported oilseeds and oils.

Tung oil and tung nut imports in 1952 will consist almost entirely of surplus supplies available in Argentina, Brazil and Paraguay. Now that supplies are no longer available from China—which has embargoed exports to this country—we shall depend entirely on imports from South America to supplement the output from our own tung groves.

Olive oil imports in 1952 again may be substantial. With a large olive crop in prospect this year in the Mediterranean Basin countries, a possible substantial reduction in price in 1952 may invite considerable interest on the part of United States importers.

Our good neighbor and customer to the north, Canada, is likely to continue to import from the United States rather sizable tonnages of soybeans, and soybean and cottonseed oils now that the Canadian margarine industry, only two and one-half years old, is firmly established. It is likely, also, that Canadian imports of inedible tallow and greases from the United States in 1952 again will be sizable. Flaxseed imports into Canada may be out of the picture because of her expanded production.

The Caribbean area, which includes Cuba, is an important market for surplus supplies of United States fats and oils. Cuba is now the largest single outlet for our lard, and buys substantial quantities of our inedible tallow and greases. In addition we export some soybean and peanut oils to Cuba.

Speakers for session on export markets and soybean grades. L to r, J. E. Barr, grain branch, U. S. Department of Agriculture; Ed Tillman, Missouri Soybean Co., Caruthersville, Mo.; Paul E. Quintus, Office of Foreign Agricultural Relations, USDA; J. W. J. Stedman, Bunge Corp., New York City; and V. I. West, University of Illinois.

Our exports of fats and oils to Central and South America are not, in general, very substantial. Furthermore, the tendency in South America is to exclude imports, and try to develop home processing industries.

Our major single export outlet is Venezuela to which we send some of our lard, under the terms of our trade agreement with that country, and some cottonseed oil. However, it is not likely that our exports to Venezuela in 1952 will exceed 5,000 tons of lard, some cottonseed oil and, possibly, small quantities of other oils.

The world's major export market for fats, oils, and oilseeds is Western Europe. All of the countries, except possibly Sweden, now rely on imports to a considerable degree. In general, Western Europe's greatest need is for edible soft oils—or the oilseeds like soybeans and peanuts. Apart from olive oil, rapeseed or colza oil is the only oil produced from domestic supplies in significant quantity. However, in southern Europe, there is also some production of soybeans, sesame, safflower and sunflower seed.

In sizing up the West European market possibilities for United States fats and oils in 1952, I would like to review some of the limitations that we are likely to encounter. First, there is the recovery in European livestock which means more animal fats on the Continent. Secondly, there is the bumper olive crop coming up in Mediterranean Basin countries this year which has a direct bearing on exports of soybeans and oil. Thirdly, the supplies from European overseas possessions and territories are showing some increase in production, and the "mother countries" give preference to these areas. And lastly, the ever-present European dollar problem will carry over and play an important part in determining export sales.

Exports Basic

Now, I would like to review some of the things I have said about the world situation as it relates to American soybeans. Of course, this involves some speculation and the chance for considerable error. But certain facts stand out for all to see. First, the American soybean industry on its present scale is relatively new. Second, in recent years, fully one-fourth of the commercial crop has been marketed in foreign countries. For the crop year just coming to an end, it looks as if exports may exceed 65 million bushels bean equivalent in the form of beans and soybean oil. This is a new record. *Thus it is clear that the export market has played a basic role in the growth of your new industry.*

It also seems reasonably certain that a strong export demand will continue for some time. Soybeans are a popular oilseed in the great fat-deficit area of Western Europe and Japan. Whatever I said before about the possible future limitations on sales to Europe, there is a great need on the Continent of soft vegetable oils for the manufacture of margarine, and oil cake and meal is urgently needed for European livestock. And the Europeans are old-timers in the crushing and utilization of soybeans. Millions of bushels of soybeans were imported and processed annually, long before we got in the business. So they know how to use soybeans and soybean products and the United States is the principal source of supply.

Japan, too, is an important outlet for our soybeans and other fats and oils. The prospects for this market are very closely tied to the international situation, but for the immediate future our close ties with Japan should mean continued soybean sales to that country.

However, it would be a grave mistake, in my opinion, to take the present export business for granted. I know your Association holds this same point of view and is making concerted efforts to develop a continuing strong export market. Things can change pretty fast. It is more than coincidental that our soybean industry expanded rapidly during the period when Manchuria was out of the world market. From the standpoint of world trade, we have essentially replaced Manchuria as an exporter of soybeans and oil. This year, Manchuria has made a substantial comeback in sales to Western Europe. That's our competition in soybeans as such.

As you know, few crops of importance in the world are so highly concentrated area-wise as soybeans. More than 90 percent of the total world production comes from the United States and China (including Manchuria). Then there are the competing oils and fats. I have mentioned the prospects for a greatly improved olive crop

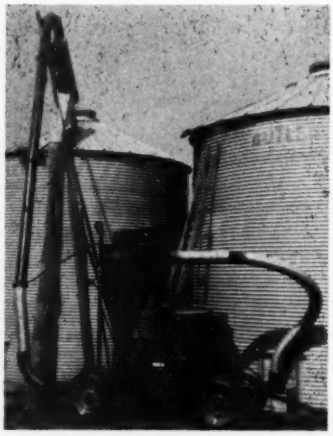
What's New in Grain Handling Equipment?

Much has been done in the way of development and machinery design to improve and simplify the mechanical handling and removal of foreign materials in soybeans. However, now with the development of the pneumatic grain handler as pictured at the **right**, another major step has been taken; it will not only convey soybeans but will condition and remove foreign materials in one operation. This naturally requires less equipment and makes the one unit a compact, universal, all purpose machine which will perform all of the jobs at the same time with minimum of labor.

During the past season several million bushels of corn were transferred, conditioned, and cleaned by the Vac-U-Vator with minimum of labor and investment.

After having tremendous success with handling corn, the manufacturer, Dunbar Kapple Inc., Geneva, Illinois, has placed all research emphasis on the soybean problem and advise that results of handling soybeans parallel that of corn. Tests have shown that soybeans can be moved over 200 feet to storage or boxcars during which time foreign material can be removed and conditioning accomplished with one operator.

Many elevator operators are now using the Vac-U-Vator with special attachments to save their peak load and foreign material discount problems. With the Vac-U-Vator they have also added a portable leg at the elevator proper, in flat storage, or at track sidings where cars can readily be made available. This new development is now in production and further technical information will be made available from the manufacturer.



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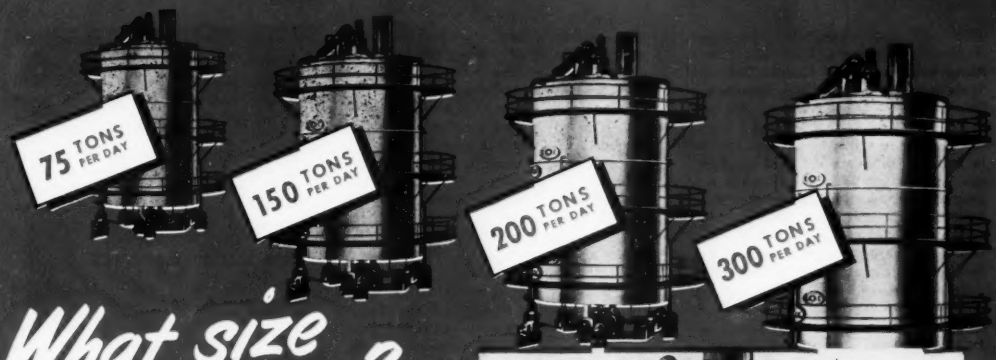

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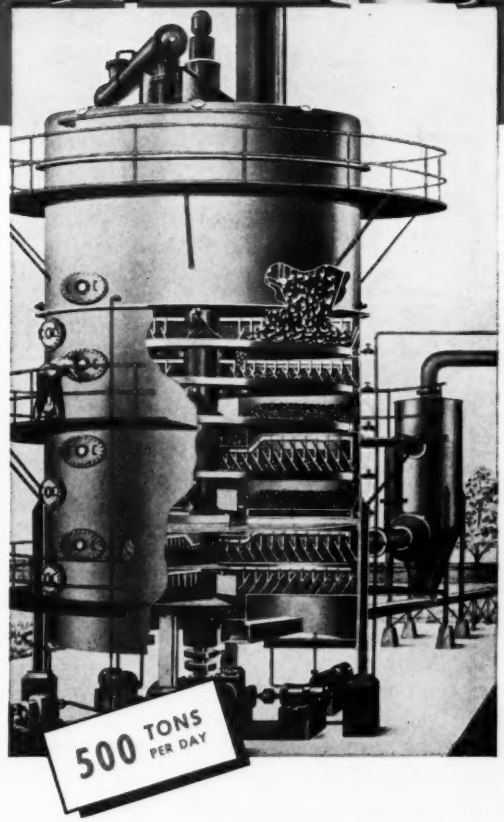

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Steam, M-lbs./hr.	6.0	7.8
Electric Power, kw.	170.0	225.0
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which will particularly affect the import requirements of Spain, Italy, and France. Along with Japan and Canada, Italy and Spain have been the leading importers of United States soybean products this year. More peanuts in West Africa and prospects for more copra and palm oil next year can be expected to reduce the need for American fats and oils. In fact, when the prospective production increases in the United States and the rest of the world are added together, we may soon find production back to the prewar level on a per capita basis for the first time since the war.

To return to your more immediate interests, I want to comment further on the recent competition from Manchurian soybeans. The first movement of any consequence since the war began with the 1950 crop. Since about Dec. 1950, a fairly steady stream of vessels loaded with soybeans has left the Manchurian port of Dairen en route to distant European ports (11,000 miles). We have good sources of information and are in a position to watch this development currently and accurately.

You might be interested to know that most of the contracts on 1950 crop Manchurian soybeans entering Western Europe have been negotiated through Hungarian firms. Since there is no private action there on matters of this kind it means the Hungarian government negotiated the sales. Hungary apparently acquired the beans through a trade agreement and resold them to Western European countries paying the highest price or offering the currency most desired by the Communists.

As we understand it, the sales terms of the Hungarians for Manchurian beans are fair average quality, pure basis, with a maximum of 5 percent brokens, a minimum oil content of 17 percent on the beans as delivered with price discounts for oil content below 17 percent, and maximum moisture of 12 percent with price discounts for moisture over 12 percent.

Manchurian Contract

Buyers are not required to pay premiums for oil in excess of 17 percent or for less than 12 percent moisture. Payment is arranged after the ship is reported in Colombo, Ceylon or Aden at the mouth of the Red Sea. Sampling is at the European port of arrival and the analysis made in European laboratories. Arbitration, if any, is in London according to the terms of the Incorporated Oil Seeds Association.

The analysis on two cargoes delivered to Antwerp was reported to us as follows:

	Cargo 1	Cargo 2
oil content	18.3%	18.8%
moisture	11.2%	11.2%

More recently it has been reported that the Manchurian soybeans are being sold by the Chinese National Import-Export Corp. in Tien-Tsin through its German agency in the Russian sector of Berlin. It seems that the beans will be processed under contract by German mills for the account of the Chinese corporation. Several cargoes are now said to be on the way to fulfill a processing contract covering about 6 million bushels of soybeans and as much as 18 million bushels may be involved.

Many European importers report the quality of the Manchurian soybeans is very satisfactory and that they prefer the method of sale and settlement. To the extent that this is true, Manchurian beans have a certain selling advantage over American beans and this may help account for their re-entry into the European market on a fairly large scale. Another advantage which we cannot overlook is that the Manchurian beans may be purchased without the use of dollars. The Europeans and other non-dollar countries are constantly seeking sources of fats and oils which they can buy with their own currencies or other soft currencies.

At the same time, I believe that we have certain real advantages in maintaining our export outlets. We have a preferred location in respect to the European market and mutually beneficial trading relations have been firmly established between our exporters and European and other importers. Most important of all, we are dealing with friendly nations who are bound together with us in a great effort to build a free world.

Your industry is contributing greatly to this effort because production of American soybeans has now reached a point where the free nations can get along with their own resources.

—sbd—

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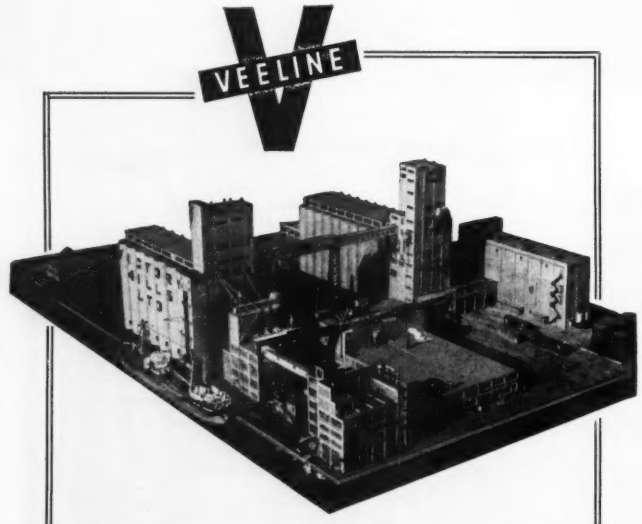

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Shipping Export Soybeans from Country Points

By ED TILLMAN

Manager Missouri Soybean Co.
Caruthersville, Mo.

ED TILLMAN

I AM ASSOCIATED with the Missouri Soybean Co. which operates in the bootheel area of southeast Missouri. We have elevators at both Hayti and Caruthersville. At Hayti our storage capacity is 200,000 bushels; at Caruthersville, 25,000 bushels. In addition to these elevators we have a general planting seed, feed and fertilizer business of which our principal sales are soybean seed.

Our principal outlet for the soybeans we buy is the export trade through New Orleans. In 1949 we exported almost a half-million bushels. In 1950 we exported 550,000 bushels. Of this 1950 tonnage we shipped out 130,000 bushels by barge through our new Mississippi River terminal at Caruthersville.

During the last two years a great change has taken place in the procedure for harvesting the soybeans. That is the self-propelled combine which was developed in the rice fields. These new machines brought both distinct advantages and disadvantages, from the country soybean buyers' viewpoint. One advantage is that the soybeans are harvested cleaner and with less splits. On the other hand, the soybeans are ofttimes harvested with much higher moisture content. The very nature of the new machines makes it possible for the soybean farmer to get into his fields quickly after a rain. In our area the fall rains usually start sometime in November, and there is always a rush to get the soybeans out of the fields before the rains set in. A great advantage of the self-propelled harvesters, however, is that they cause the soybeans to be delivered to us in bulk—eliminating the troublesome sack handling problem. We have also found that many farmers, rushing to get their soybeans harvested, put their machines in the fields too early in the morning—before the dew has dried—and continue to operate them too late at night after the dew has fallen—adding to the moisture content.

Soybean Grades

The country soybean buyer in southeast Missouri has problems in uniformity which are difficult to control, but possibly could be partly corrected over a period of years through an educational program among the farmers. Individual harvesting methods and practices account for part of the differences in uniformity, and our area's weed condition and rainfall accounts for the rest. The high fertility of the soil makes weeds grow the same as soybeans—and not all of such foreign matter is removed by the harvesters. This lack of uniformity makes our blending out process much more difficult than the northern buyers experience.

The percentages allowed for foreign matter and moisture is a subject of much discussion today among all people connected with the soybean industry. An allowance of up to 3 percent foreign matter might, on the face of it, encourage a farmer to add foreign matter to his soybeans to a point just under 3 percent in order to gain that much weight. The 14 percent allowance for moisture at the same time does not encourage him to give much thought to harvesting his soybeans drier. Our suggestion to remedy this condition and create an incentive for farmers to bring in cleaner and drier soybeans is this: *Leave the present discount basis as it is, but pay a premium for less than 3 percent foreign matter and also a premium for lower moisture.*

Our company is thoroughly sold on any sound method to result in less foreign matter and moisture coming in with the soybeans we handle. In our area we have an exceptionally high humidity condition which makes it very hazardous to store anything except thoroughly clean and dry soybeans. I don't mind telling you that we have lost a considerable tonnage of soybeans due to spoilage caused by these factors. This problem is typical from the Missouri Belt south to the gulf. No amount of turning will condition soybeans of 14 percent moisture and 3 percent foreign matter for safe storage when rain is falling every day. Mechanical drying methods so far developed have not solved the problem. They cause too many splits.

Some of the railroads have failed to produce enough boxcars to meet the heavy fall demands. Our inability to get boxcars when we needed them last year, for example, made it impossible for us to clean up the shipment of our 1950 crop of soybeans until March 1, 1951. Most of these soybeans were purchased prior to December 1.

We also have run into difficulties with our export shipments to the port of New Orleans. Many of the boxcars containing

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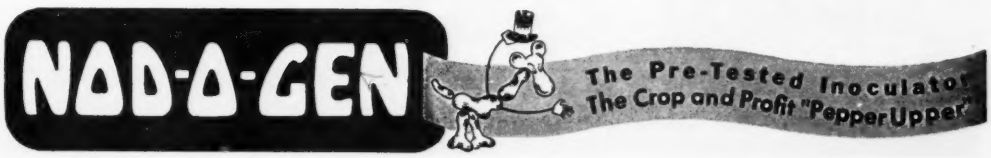

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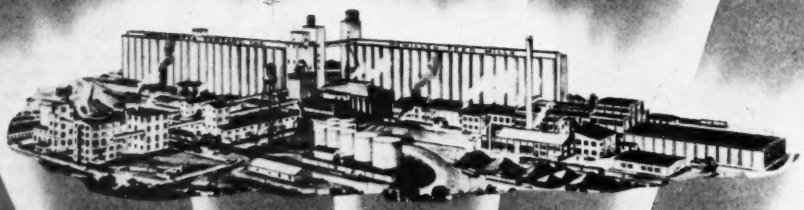

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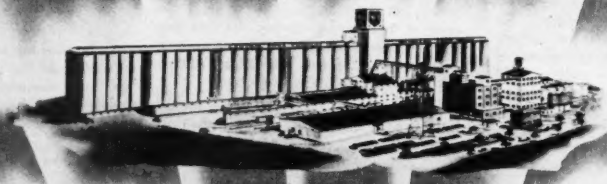

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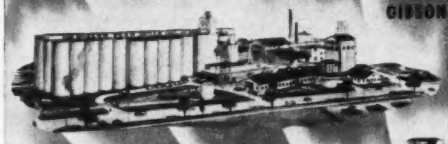

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our soybeans were on track in New Orleans for as much as 60 days before being opened, sampled or unloaded. Fortunately, all the soybeans from the 1950 crop we shipped to New Orleans were in good condition, so we sustained no losses. That is much better luck than some other country buyers had. However, the addition of the Mobile elevator should do much to relieve this congestion.

Export Rate

The rail export freight rate to New Orleans is also a subject of wide discussion among country soybean buyers in the Mississippi Valley area. From a rate of 19½ cents per hundredweight it was increased in one step to 25 cents. Another increase of 6 percent is coming up, which will make a total of 26½ cents. Our company considered this heavy increase unjustified, and to offset it we opened our river terminal at Caruthersville—where the export rate to New Orleans is 11½ cents per hundredweight. Our saving in freight to New Orleans alone is approximately 9 cents per bushel. While our use of river transportation is new, we are hoping that an additional advantage from it will be the elimination of our dependence on the export market for profitable operation each year. In this I do not mean to convey that the export trade is not desirable. Outside of embargoes and other difficulties from freight tie-ups, our experience with the export business has been very good.

We have heard a lot of complaints about jimson weed seeds in soybeans grown in our area, voiced by foreign buyers. Our company made its own survey on this matter, and in Pemiscot County we found only one field of soybeans containing jimson weeds. We think the jimson weed charge is overdone so far as soybeans from our region are concerned. Even if the soybeans do contain such seed, they are removed by processors in our area through recleaning and thus offer no hazard in livestock feed. A combination of our grades and Woodson-Tenent Laboratories' grades have never been of wide variance from New Orleans' grades. We only suffered excess dockage on less than 10 cars last fall. Our average dockage would probably not run over 2 percent, so this charge of dirty soybeans so far as our company is concerned is simply not justified.

I believe that most of our troubles can be corrected. Since the soybean industry has really come into its own during the last 10 years, it necessarily has growing pains which accompany the rapid expansion of any industry. We hope these growing pains won't cease for many years to come, but at the same time we should try to correct the faults of the industry as we go along. The country soybean buyer's life is no bed of roses.

In conclusion, I'd like to restate my principal point in this talk: *The most important improvement we can make today in the industry is to provide farmers with a greater incentive to produce soybeans with as little foreign matter and moisture content as possible.*

COWAN

(Continued from page 36)

ties of the oil as well as its retention on the stone. During the past year we have prepared compounds from soybean fatty acids derived from refining soybean oil which have promise for this use. We expect to have actual road tests conducted to determine the value of these compounds as additives for road oil. This work is a small part of our long-term research on polymerization of fat acids derived from soybean oil—long-term research which has given us many interesting products. These products have been reported to you previously as Norepol, a rubber replacement used for a limited period during World War II: Norelac, a polyamide resin used by the armed forces during World War II and now being produced commercially in even larger amounts: and dimer acid, a product from the polymerization of fat acids and also in commercial production.

In summary, I have reviewed our work at the Northern Laboratory on the causes for the flavor problem in soybean oil, on the effects of soy powder on bread, on the properties of soybean lecithin, and on road oil additives from soybean fatty acids.

—sbd—

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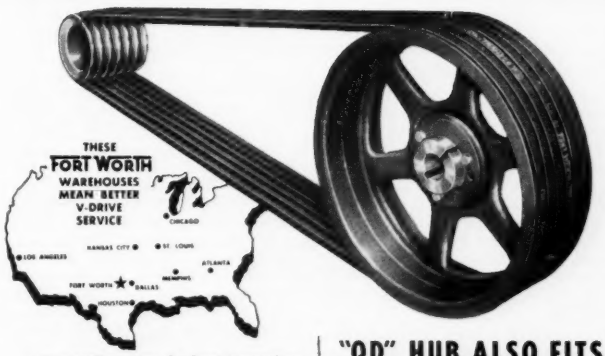

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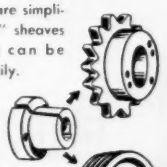

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SOYBEAN GRADES

Development of U. S. Standards for Soybeans

By JASON E. BARR

Chief, Inspection Division Grain Branch,
P. M. A.
U. S. Department of Agriculture

All United States standards for agricultural commodities are promulgated by the Secretary of Agriculture pursuant to authority contained in applicable laws. It seems appropriate therefore to introduce the subject of official grain standards of the United States for soybeans with the following statement:

"The Secretary of Agriculture is hereby authorized to investigate the handling, grading, and transportation of grain and to fix and establish as soon as may be after the enactment thereof standards of quality and condition for corn, wheat, rye, oats, barley, flaxseed, soybeans, and such other grains as in his judgment the usages of the trade may warrant and permit, and the Secretary of Agriculture shall have power to alter or modify such standards whenever the necessities of the trade may require."

That statement is taken from Sec. 2 of the U. S. Grain Standards Act. It contains the legal authority for the promulgation of standards for soybeans and other grains. It also in a measure reflects the policy of the Department in the establishment of grades or standards for grains and amendments thereto.

Here it might be well to review briefly the early history of the U. S. soybean standards. It has been stated that these standards grew up with the industry. Tentative standards were developed under a permissive authority contained in the annual appropriation act for the Department of Agriculture and made available for voluntary use by the industry as early as 1926.

After studying the application of these standards and the needs of the industry as production expanded slowly, the U. S. standards for soybeans were revised and promulgated by the Secretary under the same permissive authority, effective Sept. 1, 1935. These standards were along much the same pattern as the tentative standards but somewhat more rigid in the requirements for splits, damage, and foreign material. Although not mandatory they were used generally by the industry, both in domestic and foreign commerce.

As early as 1931 and 1932 relatively large tonnages of soybeans were exported and inspected on the basis of the U. S. grades. Further study and observation was made by the Department of the relationship of grading factors, such as splits and damage, to the quality of the soybeans in terms of the products made therefrom. In the case of splits it seemed that earlier conception of the relative value of this factor had been over emphasized. Therefore there developed a tendency towards increasing the tolerance for this factor in each of the numerical grades.

Dockage System

The limited data did not justify any change in the tolerance for damage. In the case of foreign material there developed sentiment in favor of the dockage system. At that time foreign material consisted of all material that would pass readily through a sieve with perforations 10/64 inch in diameter and all matter other than soybeans that remained on such sieve.

Earlier the percentage of moisture had been kept at a relatively high level. Changes in harvesting methods and the introduction of new and earlier maturing varieties indicated the practicability of lowering the maximum limits for moisture which was then 15 percent in each of the grades Nos. 1 and 2.

In the meantime with the rapidly increasing production of soybeans the supervision of inspections by licensees and the handling of appeals from these inspections was becoming a difficult task. There was a demand from industry that this service be handled in the same manner as that for wheat, corn, oats, and other grains; with emphasis on more extensive facilities for handling appeals.

Finally the U. S. Grain Standards Act was amended in 1940 to specifically include soybeans. In order to bring about the desired change in the inspection set up, as early as possible, the standards then in effect, which were promulgated in 1935, were promulgated by the Secretary under the U. S. Grain Standards Act, effective Nov. 20, 1940. A new era in soybean standardization and inspection had begun.

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Immediately the Department concentrated its efforts on desirable changes in the standards for the purposes of the U. S. Grain Standards Act. All available data were reviewed and special studies were made during the marketing of the 1940 crop.

Following this the Department announced a proposed revision of the standards which embodied the dockage system, a liberalization of the limits on splits, and a reduction in the limits of moisture. Dockage was defined as all material that would pass through a sieve with perforations 8/64 inch in diameter. Foreign material consisted of all matter other than soybeans that remained on such sieve. The revised standards as proposed were promulgated effective Sept. 1941.

The application of official standards for any grain is constantly reviewed in connection with the supervision of inspection. In the case of soybeans a further revision was prepared and proposed early in 1947. This proposal would have increased the limits of splits, damage, and foreign material; provide a special grade "Tough" for soybeans containing over 13 percent moisture; and retain the dockage system for handling foreign material. The special grade "Tough" for moisture was on the same principle as that now used in the official standards for wheat. Soybeans which contained over 13 percent moisture would be graded without respect to moisture and there would be added to the grade designation the word "Tough," followed by the percentage of moisture.

Public Hearings

There was pronounced opposition to this proposal when public hearings were held, and no changes were made in the standards at that time. Representatives of various segments of the soybean industry began to ask when the Department was going to stop tampering with the soybean standards. No further change has been proposed by the Department although study of the application of the existing standards has been continued. Here it should be noted that when changes have been proposed, either by the Department or by the industry, such proposals developed from observation or experience with the application of the standards in effect at that time.

It should not be overlooked that the Administrative Procedure Act became effective in 1946. Under the provisions of this Act the Department is required to give the public an opportunity to participate in regulations, standards, or other forms of rule making. This is done by publication of notice of intention in the Federal Register giving interested parties a reasonable time in which to file comments. In the case of official standards for grain it is the policy to also hold public hearings, the time and place for which are previously announced in the Federal Register, along with the notice of the proposed changes. This gives full opportunity for all interested persons to be heard or to present their views in writing.

The Department is also required by the provisions of this Act to respond to petitions or requests from responsible groups of an industry involving official standards, regulations, etc.

Some of the important segments in the soybean industry have continued to express a desire for changes in the soybean standards. In response to petitions from elevator interests, public notice was given and informal hearings were held in May and June 1948 to consider changes to eliminate the dockage system, and to combine dockage and foreign material into one grading factor in the standards. Requests also were made that splits be further liberalized and moisture lowered.

There was a difference of opinion on the merits of these proposals. After considering all data available together with comments and opinions submitted regarding the proposal, the Department announced that no changes would be made at that time, but that the records of the 1948 crop would be studied and changes if made, would be announced not later than June 1949 without further public hearings.

Accordingly the standards were revised effective Sept. 1, 1949, to delete dockage and raise the limits of splits. Foreign material was redefined to include all matter that would pass readily through a sieve with perforations 8/64 inch in diameter, which was previously considered "dockage", and all matter other than soybeans which remained on such sieve. No distinction was made between various kinds of weed seeds or other foreign material.

Again in 1950 petitions were received from organizations representing growers and processors to change the standards by lowering the limits on moisture and on foreign material by 1 percent in each of the numerical grades. The results of hear-

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ings on that proposal are fresh in the minds of everyone interested. The Department announced on Apr. 5, 1951, that no changes would be made in the soybean standards at that time.

Here also opinion was sharply divided between different groups in the industry and to some extent within such groups. It seemed best to leave the standards as they were at least until a more comprehensive survey would be made of the wishes of the industry, or until there was more concrete evidence of agreement as to requirements of the industry.

This history may not mean much to the future. It shows that the same general pattern has been followed in the organization of the standards from the beginning. For purposes of the standards soybeans are classified according to color groups yellow, green, brown, black, and mixed. Each class is divided into four numerical grades and sample grade which measure the relative quality of soybeans on the basis of minimum test weight per bushel; and maximum limits of moisture, splits, damage, and foreign material.

The present standards are not perfect, but they are practical of application. The records show improved uniformity as to the grade of soybeans between markets at which cars are inspected. This is important in a merchandising operation.

There may be some who think it does not go far enough. Statements are made that too large a percentage of the crop falls in the contract grade of No. 2 or better and that thus the producer of high quality beans is not justly remunerated for his product. Likewise the processor has pointed out that for all practical purposes soybeans are priced on a fair average quality basis.

There is no attempt here to refute any of these statements. If the industry, including growers, handlers, and processors, feels that the standards in their present form serve their purposes except for some changes in the limits of one or more of the grading factors, such changes may be considered, under the restrictions imposed by law requiring public notice and an opportunity for interested parties to submit views and comments. These changes would constitute refinements under the existing pattern.

Oil Content

Over the years there has been talk about incorporating oil content, for example, in the official standards as a grading factor. This may be desirable, but as of this date there is no quick, practical method for determining oil content of soybeans that can be used by inspectors in the grading of this commodity. Progress is being made towards developing such a method. Although a quick practical method may be developed for determining this factor the question still would have to be decided as to whether it should be included as a grade-determining factor in the standards. This item is mentioned for illustration only and not as a proposal.

Speculation here as to the many possible departures from the present approach to soybean standards may not be timely, but there will always be new ideas regarding methods of evaluating soybeans and other grains. Improvements in production and harvesting methods, introduction of new varieties, and changes in marketing practices point up the need for refinements in standards from time to time. Fundamentally standards serve parties whose interests are opposed. Therefore, they must find a middle ground as a basis for measuring quality—not too tight, not too loose.

It is believed that there is general agreement as to the objectives. There may be differences of opinion regarding the structure of the standards by which that objective can be obtained. Whatever system of grade may be agreed upon it should be kept in mind that when such standards have been promulgated by the Secretary their use becomes mandatory for all soybeans sold by grade and shipped or delivered for shipment in interstate or foreign commerce. The standards therefore must be of practical interpretation, quickly and readily applied in order to facilitate the marketing and transportation of grain in interstate and foreign commerce.

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Grading and Pricing Soybeans

By V. I. WEST

Assistant Professor of Agricultural Economics, University of Illinois College of Agriculture, Urbana, Ill.

WE MAY WELL BEGIN by recognizing that the job of grades, or discount schedules, or any other quality measure for soybeans is to reflect, at the various marketing levels, the processors' demand for oil and meal in soybeans. The commercial value of a bushel of soybeans depends on the quantity and quality of the oil and meal it contains. Practically neither the quantity nor the quality of the oil and meal can be used in commercial trading. We must, therefore, improvise measures to substitute for the determination of the quantity and quality of products from a bushel of soybeans. In doing so it is important that all available information be fully utilized.

It is also important that the measures adopted be operable at *all* marketing levels. In production the job of quality differentiation or quality standards is to encourage the economical production of good soybeans. Whatever the standards and commercial practices used they will encourage (1) production in areas where soybeans have the greatest advantage, (2) choice of varieties which yield the greatest net return (not necessarily the greatest price or the greatest number of bushels), and (3) selection of growing and harvesting practices which result in soybeans which are as clean and as sound as the trade will pay for. It is important that varieties and qualities which are commercially sound be encouraged, and that production be encouraged in areas which are well adapted to soybean production.

From the point of view of elevator operators or dealers the standards should provide a guide for handling, storing and pricing the soybeans. They should be set up to discourage unnecessary blending, and also in such a way that no penalty to the dealer results from degrading due to blending, unless the degrading actually represents loss of quality.

Processors want standards which will permit them to pay for soybeans according to the amount and quality of the products which they can get from the soybeans. The standards should be such that variations in the average quality of the soybeans the processor buys will automatically be reflected in their raw material costs.

Grades as quality standards. Present soybean grades do not add enough to processors' knowledge of the value of soybeans to be useful as a measure of quality. There are at least two reasons for this. First, the grades are based in part on factors which are meaningless. I will discuss the factors later. Secondly, the grade limits on the various factors do not mean the same thing with regard to quality. For example, the difference between No. 2 and No. 3 soybeans is any one or more of the following: 2 percent moisture, 10 percent splits, 2 percent damage, or 1 percent foreign material. Obviously 1 percent foreign material is of less importance than 2 percent moisture in determining the quantity and quality of the product. But graduated use of the separate factors eliminates this problem.

I shall not describe soybeans grades. I would like, however, to comment on some of the grade factors.

Test weight is a measure that was developed and tested for wheat and was adopted as a general indicator of quality in soybeans. Test weight does indicate variations in foreign material and moisture but these factors are measured directly, and test weight is therefore not needed in this connection. High test weight indicates low oil content when foreign material and moisture are constant, but so roughly as not to be a useful value indicator. This conclusion is based on extensive observation of inspection data and is derived specifically from statistical analysis of samples from 200 carloads in Illinois in 1948-49, and 25 carloads in each Iowa and Illinois in 1938-39 and 1941-42.

Moisture is the most important index of commercial value of soybeans in most seasons. It affects value in two ways: (1) it determines the amount of dry matter and (2) when it is above 12 or 13 percent, it prevents or limits safe storage of the soybeans.

Splits is another nearly meaningless grading factor. The arguments for using splits as an indicator of soybean quality are: (1) they are useless as seed; (2) they tend to become rancid in storage, to furnish media of fungus growth and to yield lower quality oil; (3) they need not be present in carefully handled soybeans.

The facts are: (1) commercial soybeans are not intended for seed; (2) the quality of the oil from splits is lower but the amount of oil is greater; and (3) splits discounts are unlikely to affect harvesting practices of farmers. Splits cannot be regarded as a serious defect in soybeans for domestic processing.

Damage. A variety of conditions come under this heading and little is known about them. Some of them do not affect either oil yield or quality. Others affect both

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yields and qualities. Some defects which have a marked effect on oil yields are not classified as damage. In most years damage is not a serious problem. There is need for better measures of damage, and more accurate knowledge of the effect on commercial value of the different kinds of damage.

Foreign material. Foreign material is an important factor in determining the value of soybeans. Much of it is worthless, nearly all is of less value than soybeans. Soybeans containing much foreign material should be severely discounted. Since most foreign material may be kept out in proper threshing, it is important that grading and pricing be designed to encourage farmers to clean up their soybeans and to encourage others to keep them clean.

Grade factor discount schedules as quality standards. Grades have been rejected by soybean buyers in favor of a schedule of discounts because the grades do not use all the information available with regard to quality. The present discount schedule has at least three needless defects: (1) it is based on No. 2 soybeans; (2) it is highly inflexible through time; and (3) it includes discounts for all grade factors whether or not they have any meaning in indicating commercial value. None of these defects need to be continued.

The Grain Standards Act requires that grain sold by grade be sold on the basis of official U. S. grades, but not that the price be determined by grades. Discount schedules could readily be changed when price levels change and the meaningless discounts could and should be discontinued.

Test Weight

Test weight discounts are meaningless and in addition are rare. Few soybeans weigh less than 54 pounds per bushel and those which do usually contain high foreign material which is accounted for directly.

Splits discounts are also nearly meaningless. The deterioration in oil quality in split soybeans is more than offset by an improved extraction rate. Practically, soybeans with over 20 percent splits are unknown at the farm level. In the terminal and export markets splits discounts may affect elevating practices in some desirable way, but I am not sure that they do.

In most years damaged soybeans are extremely rare.

Moisture and foreign material are therefore the two effective and meaningful discount factors.

Standard bushels as quality standards. Let us disregard storability of the soybeans for this discussion. Most Midwest soybeans can be safely stored. If soybeans are too wet to store they should be more heavily discounted than will be indicated here. The discounts I will derive are probably adequate over the storage range of moistures, and may be regarded as minimum discounts over the entire range of moisture contents.

We may assume what the buyer wants is the dry matter in soybeans—that he does not want either moisture or foreign material.

If bids are to be based on average quality soybeans then the basis quality should be somewhere near average. The basis quality may be taken as soybeans with 12 percent moisture and 2 percent foreign material. Discounts or premiums should be based on deviations from the amount of soybean dry matter in the soybeans of basis quality. The objective would be to pay the same for this amount of dry matter regardless of the amount of moisture and foreign material sold with it.

Consider two carloads of soybeans with the moistures of 16 and 10 percent and foreign materials of 4 and 1 percent and alternatively assume bids of $3.00 and $2.50 for soybeans of basis quality.

	Weight (lbs.)	Moisture (percent)	Foreign material (percent)
Car 1	90,000	16	4
Car 2	90,000	10	1

Present practices would value these soybeans as follows:

Car 1, discount 1 percent by weight for foreign material and 6 cents per bushel for moisture, 90,000 - 900 divided by 60 = 1,485 net bushels, 1,485 net bushels × $2.94 = $4,365.90.

Car 2, 90,000 divided by 60 = 1,500 net bushels; 1,500 net bushels × $3.00 = $4,500.

Since this carload is No. 2 whether in both factors there would be no discount.

Thus present practices value the second carload as being $134.10 more than the

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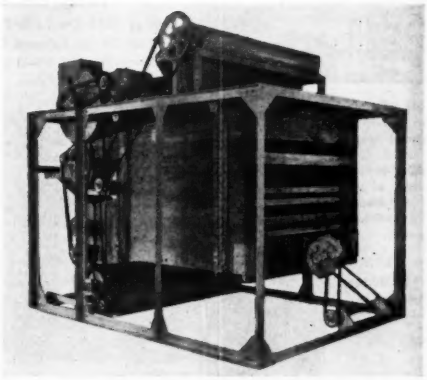

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first. If figured on the basis of $2.50 bid the difference would be $126.60.

Now let us look at these two carloads in terms of standard bushels of 12 percent moisture content and 2 percent foreign material content. Such a standard bushel contains 51.744 pounds of soybean dry matter. This may be determined approximately by deducting (12 + 2) 14 percent from the 60-pound gross bushel giving 51.6 pounds. If this is adjusted for the moisture in the foreign material it becomes 51.744. The soybean dry matter which Car 1 with 16 percent moisture and 4 percent foreign material contains may be determined by deducting 4 percent of the gross weight for foreign material giving 86,400 pounds of soybeans, and then deducting 16 percent of the 86,400 pounds for moisture giving 72,976 pounds of soybean dry matter. Dividing by 51.744 gives 1402.60 standard bushels.

Car 2 with 10 percent moisture and 1 percent foreign material contains soybean dry matter equivalent to 1,549.74 standard bushels. Deducting 1 percent foreign material gives 89,100 pounds of soybeans. Deducting 10 percent moisture gives 80,190 pounds of soybean dry matter; 80,190 divided by 51.744 gives 1,549.74 standard bushels.

The values of the two cars based on the soybean dry matter each contains would be $4,207.80 and $4,649.22 if $3 per bushel were bid. This is a difference of $441.42. If $2.50 were bid the difference would be $367.85. The value per net bushel as defined by the trade can be determined by dividing the carload values by the number of net bushels. In the case of the $3 bids these are $2.83 for Car 1 and $3.10 for Car 2.

This arithmetic may seem complex when carried out in detail. In practice the whole thing could be accomplished from a chart showing pounds per standard bushel. For Car 1 the chart would show 64.176 pounds per standard bushel and for Car 2, 58.074 pounds per standard bushel.

Of course, if this new definition is too much of a change nearly the same thing could be accomplished with the same type of discounts that are now used. The only changes needed would be to extend the scale of discounts and premiums over the whole range of qualities marketed. For simplicity foreign material discounts and premiums as percent deviations from basis quality can be used. The moisture discount schedules appropriate for deviations from basis quality should depend on the prices.

Price	Rate of discounts (cents per percent)
$2.00	2.3
2.50	2.8
2.64	3.0
3.00	3.4
3.50	3.9
3.52	4.0
4.00	4.5
4.50	5.1

Using this system Car 1 would have a 2 percent discount because of foreign material, and would have discount of 13.6 cents because of 4 percent higher moisture content than basis quality.

1,500 bushels less 2 percent is 1,470 bushels.

1,470 bushels times $2.864 is $4,210.08 total value.

On the same basis Car 2 should have a 1 percent premium because of low foreign material and a 6.8 cents premium because of low moisture.

1,515 × $3.068 = $4,648.02 total value.

This difference is nearly the same as that found by using standard bushels: $437.94 in this system compared to $441.42 for standard bushels.

Present practice which neglects these differences does not encourage producers to market clean dry soybeans, does not encourage handlers to keep them dry and clean, does not furnish handlers with realistic guide for blending or binning, nor insure processors that the soybeans they process will be of the quality they pay for.

Proposed Changes

I would like to see the following changes made in soybean grading and pricing:

1. Eliminate the meaningless measurements from grades and grading.

2. Price each lot of soybeans according to its value. There are two important variables, amount of soybean dry matter and composition of the soybean dry matter. A proper discount schedule would account for the amount of dry matter.

3. Make soybeans deliverable on future contracts according to the same standards as are used in the country. I have not discussed this point but it follows from my opening statement—the job of quality standards is to reflect processor demand for oil and meal in soybeans at all marketing levels.

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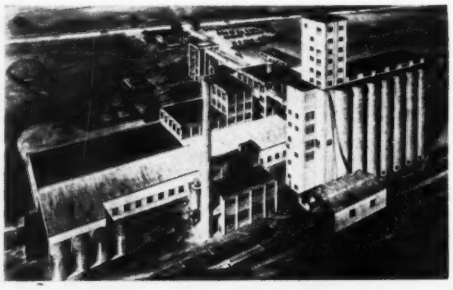

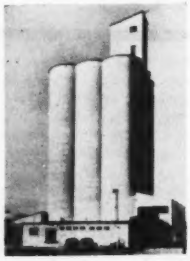

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Britain's Oil and Fat Position

By C. G. HEYWOOD

London, England

C. G. HEYWOOD—In England he's called the "Baron of Soy"

I FELT a little diffident in accepting the invitation of Mr. Strayer to make some statement on the British oil and fat situation, because my background is that of a large industrial oil user. There is, in England, due to lack of supplies, something of a clash between the food interests and the technical interests, where an oil is of a type having both utilizations. This shortage of supply is brought about largely due to lack of dollars.

I expect you will ask me why the soybean has not been grown with the same gusto and enterprise that characterizes the soybean industry in America, which so many here so ably represent.

Our country, Britain, is a small island. We have 50 million people in that small island. We can only, from our acreage, support foodwise, less than 20 million people. We have, therefore, to import our foodstuffs, and pay for them by our exports, or by the services we render. In the old days, Britain had immense capital invested in overseas territories, which brought in much in the way of income. These capital investments are no longer of the size they formerly were.

Now, what made you soy men grow soy? Basically, cottonseed oil was the beginning of your edible vegetable food oil industry. Cottonseed oil was not available in sufficient quantity to march with the demands of the American purchasing power for edible fats. So you stepped in with the soybean.

Now we, in England, do not have those acres which you have, neither have we got the climate that permits us to grow anything but that which is peculiarly suited to our climate and to our economy. That is obvious. Our climate is not suited to grow soybeans. In fact, our climate is not suited to the growing of any oilseeds, with the possible exception of poppy seed, linseed and, in a small way, sunflower.

Essentially, we Britishers rely upon those territories where climatic conditions do favor the growing of oilseeds from which our technical and food industries can benefit.

I think there was another reason why the soybean was never grown in our Empire. That was always the fear that the economic price of the soybean would be dictated by the price ruling from the low labor cost countries of the Orient, mainly Manchuria.

Protected Farming

You yourselves in America are a protected farming community, and under that protection your botanists, your plant breeders, your makers of agricultural machinery and your processors have all been co-operating with the farmer to win from the soil oils, fats and proteins.

Your soybean history is an epic in agricultural and industrial application.

Why, therefore, have we Britishers not copied your excellent example? There has been much mistaken thinking about the soybean. I would almost say that there has been "shut mindedness" against this valuable commodity. If I tell you that a prominent government adviser dismissed soybean, only a matter of four years ago, as being useless, because (1) there was only 13 percent oil content in the soybean and (2) soybean oil would not dry, you will appreciate that those of us who have seen the merit of the soybean, and its oil, are up against what we call incessant frustrations and prejudices.

The company in which I spent a lifetime of service, in the paint industry, because of the fact that we had manufacturing capacity in China, was always very knowledgeable on many of the oils derived from oriental sources. For that reason, I suppose we were the earliest users of soybean oil on a large scale, especially with regard to the manufacture of alkyd resins.

With World War II and the desperate shipping shortage, attempts were made to grow linseed on a large scale on British acreage. At first, there was great prejudice against this, and it was said that linseed, or flax as you call it, exhausted the soil, and that the British climate was unsuitable for linseed growing.

This proved to be completely wrong, and very effective cultivation of linseed took place. In the first year of a three-year period, some 60,000 acres were put to

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linseed growing, and a high average bushel yield per acre obtained.

Subsequent seasons were most unkind to the linseed venture, as we suffered from excessive rain, and the crops were ruined. Such are the vagaries of the British climate.

I would like to say that we found one extraordinary value from linseed growing, and that was that it was a magnificent crop to clean sour pasture from wire worm. By following the linseed with winter oats and then wheat, and then putting the land back to grass, we produced magnificent pasture, capable of many years of good service.

Improves Pasture

But you will see that this pasture-improving capacity of linseed means that, on a rotational method, the frequency at which the land can be put back to linseed is about one year in 15, and that reduces enormously the acreage available for linseed.

Now, two matters materially affected the oil situation in England. Perhaps I should say three. First of all India found herself unable to feed her population, and desired to maintain, within her economy, anything that could be treated as a foodstuff. Therefore India was no longer a seller of oilseeds, except in negligible quantities.

The Argentine, seeing that they had virtually a monopoly for their exportable surplus, changed their policy from the selling of seed to the crushing mills of Europe, to selling the oil and the cake from the Argentine mills.

You Americans formerly had imported as much from the Agentine as was grown in America. As a result of a dollar price support of, I think, $6.50 per bushel, you increased your domestic production from 18 million bushels, out of a total utilization of 36 million bushels, (the balance being imported, mainly from the Argentine), to a total production in 1948 of 52 million bushels, an all-time high.

Canada, too, was growing more acreage of linseed and producing more and, in a world unencumbered by currency restrictions, the linseed, or linseed oil, from Canada would have reached the rest of the world.

But, we are dollar-poor and we cannot afford to spend our dollars on oilseeds. At least, so our economists say. In consequence, we in Britain, as far as drying oils are concerned, were very dependent on the Argentine government, who had assumed the position of bulk monopoly sellers.

As a result of the shortage of linseed oil for paint and linoleum in particular, I undertook to do certain negotiations and investigations for the British government, concerning the buying of linseed oil from the Argentine government.

In 1946, business necessitated my visiting Africa, and I became interested in the development of farming there, with a view to rectifying the weakness of our oil position in Britain. This started me in a campaign to try to develop oilseed farming interest in our dominions and colonies. Climatically, only Canada, and parts of Australia, and some very small parts of Africa, were capable of making a success of flax growing whereas, in Africa, in Australia and in other territories, the opportunities for the growing of the soybean were, and are, immense.

Unfortunately, there were certain factors which prejudiced the implementation of my ideas and ideals. The vast Lever Bros./Unilever Combine had, in their subsidiary United Africa Co., a managing director of vision, Mr. Samuel who, flying up the east coast of Africa, over what is known as the great plain of Kongwa, believed that, in that vast expanse of land, then put to little use, there was the opportunity to clear a great area which could be put to the growing of oilseeds, preferably the ground nut.

The British government decided to control and operate the ground nut scheme and the matter, I regret to say, became a political battle between rival ideologies, rather than a business proposition.

Unquestionably, the peanut, with its 42 percent oil content, is a magnificent source of supply of valuable bland food oil. Whilst you have developed great industries, foodwise and technically on the soybean, from your farming economy, we have taken advantage of our ground nut to be a source of our main food oil.

Now, it is something of an anomaly that West Africa and Nigeria, natural habitats of the ground nut, were producing vast surpluses of this nut, far beyond the capacity of the railways there to transport them to the coast to relieve our fat shortage in this country.

Ground Nut Scheme

At the same time, the East African ground nut scheme was being proceeded with and, I am sorry to say, with great difficulty in the clearing of the bush, lack of rainfall and lack of transportation to the nearest port some distance away.

Attempts were made to grow other materials than ground nut in the Kongwa area and a white paper, an official British government publication, shows that they had some measure of success with sunflower, but that the soybean experiments were not satisfactory.

Personally, I believe that the varieties used were unsuited to the climatic conditions, as the beans they planted reached the shattering state when the plant had only some eight inches of total growth.

I have seen the work done by the plant breeders in Potchefstroom, in the Transvaal, and at Gwebi in Southern Rhodesia, and varieties have been evolved to suit the South Africa and the Rhodesian climates and, unquestionably, I believe varieties could be evolved to suit the more equatorial parts of Africa.

I have a great belief that the soybean, in time, will become the staple foodstuff of the black populations of Africa, which, at present, are short of protein.

I am glad to say that enlightened governments in our Dominions are keenly conscious now of the tremendous importance that oilseed farming has in the economy of a country, and I believe that the soybean will find its way into Africa and Australia and even, maybe, New Zealand.

There are two factors which will pro-

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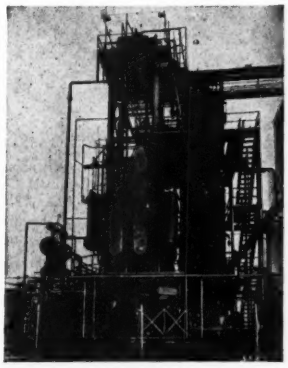

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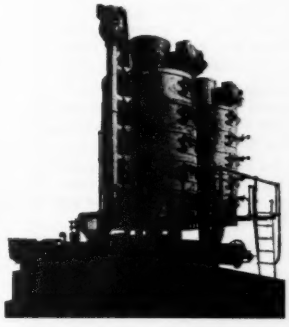

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foundly affect the food and technical oil position of Britain. One is an early clarification of the dollar position of the sterling area in relation to the dollar area, and the other is a great availability, from West Africa, of palm kernels and ground nuts.

If these two factors can, somehow, be met I believe that soy oil will then be released for industrial utilization, and that will be received with acclamation by the technicians of the British paint and linoleum industries.

I have purposely kept my talk as brief as possible, but I would like to say that I have studied drying oils, near drying oils and food oils in practically every country in the world, Brazil, Argentina, all over Africa, India, Burma, China, Australia, New Zealand, quite apart from my frequent visits to Canada and America.

Always have I received, from my American friends, the greatest hospitality and the greatest co-operation. I regret that this miserable dollar isolation precludes us Britishers and our Empire Associates from taking greater advantage of the terrific, almost overwhelming, kindness and co-operation that appear to be available from you, my American friends.

Through the kindness and courtesy of Sir Herbert Davis, vice chairman of the Unilever organization in England, I am able to quote from an address given by Mr. Faure in January 1950 in New York, and revised and reprinted in the Unilever publication "Progress."

Mr. Faure points out that there are surpluses in some areas and shortages in others, and that this is held largely to be caused by dollar shortages. In his view, the dollar shortages are not the only reason for this situation. He considers that centralized buying and selling by governments and bilateral trading also must bear their responsibility. To quote Mr. Faure, "Today business is canalized into deep channels."

In his view, the war-time rationing in the U.K. was probably the best in the world but, though the war has been ended for six years, the same system still operates almost without change.

So far as oils and fats are concerned, the control of margarine is the most complete of all. The Ministry of Food is the sole buyer and importer of raw materials. The crushing and processing, and the margarine manufacture are done for a margin fixed by government.

In soap making, the appointed soap factories purchase their materials from the government at a fixed price, and sell their goods to the consumer again at a fixed price. Practically all raw materials are government controlled from point of arrival in the country to delivery to the final consumer.

Largest Importer

Even in prewar days, the U.K. was the largest importer of fats and oils, her net imports averaging around 1,500,000 tons. Home production fills only 6 percent of the total needs. British West Africa supplies about one-third of our total imports and, not only is the buying controlled in the U.K., but also the selling, through the Nigerian Produce Marketing Co., which has absolute monopoly of all export of oilseeds and oils. It is a government institution and the Ministry of Food has priority of purchase. From New Zealand the U.K. imports butter and tallow, again on a government to government basis with no private trading possible. The same applies to Australia and, in the case of whale oil, the only buyer is the Ministry of Food.

The United Kingdom internal supply has greatly improved, especially during 1949, when imports were 13 percent better than the previous year and almost equal to prewar imports. There was a drop of 50 percent in home production, which was offset by a cut in exports. The per capita production, in spite of a population increase of 3 million over prewar, is rapidly approaching the prewar figure which, before the war was 65.8 pounds, in 1949 reached 64.0 pounds and, in the current year, should reach 65.1 pounds. These figures include the amounts used for industrial production such as paint and linoleum.

World production at the present time falls short by 1,870,000 tons of that amount needed to supply the average person with the same level of fats and oils as before the war. Lack of purchasing power will probably restrict consumption levels of fats to an amount below prewar level for some considerable time.

Great U. S. Production

The world has been aided enormously by the great American production in recent years. Between 1935 and 1939 the United States were net importers of an average of 850,000 tons of fats and oils. In the current year, it is anticipated that the United States will export a net of 300,000 tons. As a result, the rest of the world is 1,500,000 tons better off. If American domestic production levels had remained at prewar levels, the world shortage would have been great indeed.

The world shortages are apparent. European production is still about 250,000 tons below prewar. Before the war India had a surplus of 500,000 tons of oil. Today, owing to increase of population, her exportable surplus is reduced to between 100,000 and 150,000 tons of oil.

The reduction of exportable surpluses from certain areas in the world, together with the restriction on Antarctic whaling, produce a deficit of 2 million tons. There are, of course, areas where there have been increases in exports and the gap has been greatly reduced by the enormous American production of fats and oils.

UNITED KINGDOM FATS AND OIL SUPPLIES

Analysis of Imports by Countries	Year 1949 Metric Tons (000)'s	% of total	Year 1948 Metric Tons (000)'s	% of total
Br. West Africa	510	33	451	33
New Zealand	162	11	167	12
Australia	83	5	76	6
Malaya	61	4	53	4
Ceylon	41	3	62	5
Other Brit. countries	130	8	156	11
Brit. Whale Fisheries	118	8	108	8
Denmark	96	6	53	4
Argentina	101	6	125	9
Uruguay	44	3	—	—
U.S.A.	32	2	—	—
Indonesia	45	3	—	—
Other countries	119	8	111	8
Total *	1,542	100	1,362	100

* Includes actual weight of butter.

UNITED KINGDOM FATS AND OILS SUPPLIES

Metric Tons (000)'s

Estimated Total Supplies	Average 1934-38	1948	1949	1950
Indigenous Production	160	73	84	95
Retained Imports (inc. Brit. Whale Fisheries)	1,417	1,301	1,486	1,470
Exports (inc. fat. cont. soaps)	171	49	55	65
Apparent Supply	1,406	1,325	1,515	1,500
Population (million)	47.1	50.0	50.4	50.8
Per capita (lbs.)	65.8	58.4*	64.0	65.1

* Assumes some additions to stocks

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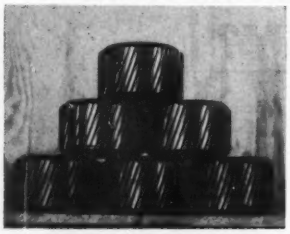

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Chemical Harvest Drying of Soybeans

By RALPH E. CARLYLE

R. E. CARLYLE

During the last 15 years soybeans have come to occupy an important place in the agriculture of the U.S.A. Growth of this crop has resulted in a superior system of agriculture particularly in the Cornbelt. Farmers are reaping the benefits of inclusion of soybeans in their cropping system.

Along with the benefits, some serious disadvantages have existed. In much of the soybean growing regions, it has been almost impossible to harvest soybeans until after heavy frosts. The plants, or parts of them, remained succulent enough that combine harvesting was impossible. By the time a frost had occurred the season usually had advanced into the period of fall rains which still further delayed harvesting. Hence, many farmers have never been able to harvest all their soybeans until sometimes as late as December. By this time the bean pods had shattered and from 15 to 40 percent of the crop lay shelled on the ground.

Weathering also reduced the quality of beans delivered to the elevators. The total result, in spite of the development of early varieties, was that many farmers lost a sizeable portion of their crop by shattering and received a lower price for poor quality for a certain part of the remainder. Associated with these disadvantages was the worry and dissatisfaction of a crop that dragged on and on, not permitting land to be sown to fall crops.

One other factor has often complicated the harvesting of soybeans. Some bean fields may be ripe and ready for harvest but the presence of green smartweed, pigweed and grasses prevents combining as the green weeds clog the combine and twist around the cylinder. Hence, even although the bean crop was ripe, dry harvesting had to be deferred until heavy frosts killed the weeds.

Chemical Harvest Drying

The conception of the chemical harvest drying of farm crops grew out of some soybean tests conducted by the Monsanto Chemical Co. in 1948. At this time some soybeans were sprayed with penta chlorophenol formulations at Ellesbury, Mo. It was noted that the sprayed plants were defoliated and quickly became dry enough to harvest.

In 1949 the Shell Chemical Co., and H. I. Cohn of Valley Farms, Carrollton, Ill., became interested in the idea of harvest drying. In due time several acres of soybeans on the Valley Farms were aerially sprayed with penta chlorophenol oil solutions at rates of two, four and six gallons per acre. The original work in Missouri involved much larger volume rates. H. I. Cohn maintained that the volume applied must be kept low to be practical. He suggested a range of two to six gallons per acre which was accordingly tried. The results were entirely satisfactory even at the two gallon per acre rate.

Mr. Cohn was so impressed that he proceeded to spray approximately 800 acres immediately. During this particular season, weather conditions were excellent and it was found that when hot dry conditions prevailed, soybeans could be harvested in as little time as 48 hours after spraying.

It was also learned that in some cases yields were increased by as much as 10 bushels per acre simply by being able to harvest the soybeans before any shattering took place. Lastly, but not least, a sizeable portion of the treated 800 acres were delivered to the market in time to receive the higher prices that prevailed before the general crop was available. Finally, it was apparent that weeds as well as the beans were dried by the chemical formulation.

Application

The chemical harvest drying of soybeans has been largely done by the aerial application of the drying agents. Hence it is important that we understand some of the peculiarities of aerial spraying.

In all spraying work the first essential is uniformity of application. This is relatively easy to attain in ground spray rigs simply by evenly spacing the outlet nozzles along a spray boom and maintaining the correct spray pressure and boom height to obtain uniform coverage.

In aerial spraying work it quickly became apparent that modifications were necessary. The conventional nozzle arrangement applied to aircraft spray booms resulted in uneven spray patterns in the field.

LD-303

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LD-304

A study of the behavior of airflow around a spraying aircraft in flight explains the idiosyncrasies of aerially applying liquid sprays. The application is complicated by propeller air disturbance and deflection of air flow by the aircraft. In other words, the airplane in flight disturbs the air causing deflections which result in uneven spray patterns if nozzles are spaced as in ground rigs. Actually the slipstream from the propeller causes air to circulate from left to right and hence spray particles caught in this motion tend to concentrate slightly to the right. Secondly there is a tendency for air to move in and concentrate towards the center of the spray path. Lastly air is deflected downward. This last movement is a distinct advantage as it quickly carries the spray down toward the ground.

The design of the aircraft influences the amount and direction of air deflection but in general an even spray pattern is obtained as follows: To counteract the light pattern on the left side of the center of the aircraft it is sometimes necessary to place the nozzle outlets about a few inches off center and have one more nozzle on the left side of the boom than on the right side. To overcome or improve the tendency for spray patterns to be heavy in the middle and lighter towards the outsides of a swath, it is necessary to space the nozzles so that they are closer at the ends of the spray boom and farther apart as the center is approached with none for three or four feet at the center.

Since many designs and kinds of airplanes are used in agricultural spraying operations it is impossible to outline a single standard nozzle arrangement for all of them. Rather, each operator has to determine for himself the arrangement that gives a uniform spray pattern. This can be done by placing a 40-foot strip of heavy brown wrapping paper on the ground, flying over this and spraying at the height and speed to be used. The test spray mixture can be fuel oil or any spray with a strong oil soluble dye added. A strong water solution of a bleaching compound such as chlorox has been employed. Any of these devices will show up well enough on the paper to determine the uniformity of the spray pattern and its effective width.

Equipment Cleaning

Cleansing of equipment sometime requires special attention. Aerial spraying of 2,4-D and 2,4,5-T has become a common practice in brush control work. Both these compounds are plant hormones and lethal in very small amounts to certain crops like cotton. Hence an operator using these herbicides should be very careful to thoroughly clean all equipment before undertaking the spraying of susceptible crops with insecticides or other herbicides. Some authorities even advocate a separate plane for the spraying of the plant hormones.

2,4-D and 2,4,5-T can usually be cleaned from equipment with a 1 percent solution of household ammonia or a suspension of activated carbon. In using the ammonia solution the spray system should be first cleaned with water. Then fill the system with a 1 percent ammonia solution and let it stand for at least overnight; after this is drained off, water should again be rinsed through the equipment.

Cleaning with activated charcoal is much faster but more expensive. A 1 percent suspension of commercial activated charcoal is rinsed through the equipment for two minutes, followed by clean water. The charcoal will clog the screens of small size nozzles so these have to be removed and rinsed separately.

Neither method is always completely effective. To check the equipment, fill with water, then spray seedlings of a sensitive test plant, such as young bean or tomato. If the plant is not affected within one or two days, the sprayer is safe for further use.

These directions do not apply to wooden tanks as it is practically impossible to remove 2,4-D or 2,4,5-T from such containers.

1950's Experimental Testing

The 1949 tests, while spectacularly successful, left many unanswered questions. Up until the fall of 1950 only pentachlorophenol oil solutions had been used. It was decided to further investigate oil-pentachlorophenol solutions varying the penta concentrations from 2½ to 7½ percent. Also, it was decided to study the possibility of using water-oil emulsions containing pentachlorophenol varying the concentration from 2½ to 5 percent. On Sept. 19, 1950, seven tests were applied by plane at Valley Farms, Carrollton, Ill. The tests were sampled seven days after the formulations were applied, the time interval between application and sampling being long

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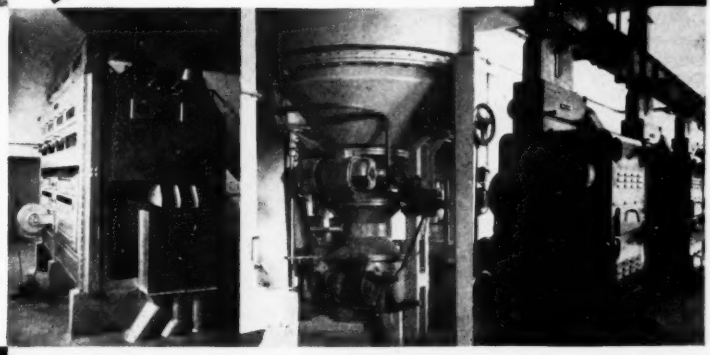

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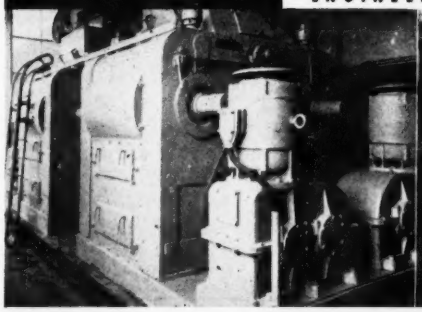

Moisture Content, Pentachlorophenol Residues and Germination Tests on Soybeans Chemically Sprayed for Harvest Drying

Test No.	Formulation	Volume rate per acre	Average % Moisture content of bean plants (wet basis) before treatment	% Moisture (Wet basis) on bean plants 6 days after treatment	Germination of Seed Percentage	Penta residue as ppm. on soybean seed
Check			42.9	36.8	83.5	0.2
No. 1	5% pentachlorophenol oil solution	3.5 gals.		30.1	81.5	0.8
No. 2	3¾% "penta" oil solution	4.1 gals.		25.2	82.5	0.8
No. 3	2½% "penta" oil solution	3.1 gals.		34.0	87.0	1.0
No. 4	7½% "penta" oil solution	3.1 gals.		25.6	82.5	1.4
No. 5	5% "penta" emulsion	2.5 gals.		19.8	91.0	0.6
No. 6	3¾% "penta" emulsion	2.5 gals.		29.5	92.0	1.0
No. 7	2½% "penta" emulsion	2.1 gals.		30.8	89.0	0.6

because of wet weather. The data collected is contained in the above table.

Results

1—Visual observation by three different people rated both the oil solution and oil-emulsion tests at 2½ percent as inferior to those containing higher concentrations of penta.

2—At the time of sampling, the average of the moisture content in the checks was 42.9 percent. In the treated tests the highest moisture content was 34.0 percent (Test No. 3—2½ percent penta oil solution), the lowest moisture content was 19.8 percent (Test No. 5—5 percent penta oil water emulsion).

3—In every case the oil-water penta emulsions resulted in as good drying as the penta oil solutions.

4—There was little significant difference between penta concentrations ranging from 3¾ to 7½ percent either in straight oil solutions or oil-water emulsions. Certainly as the tests appeared this year there was no advantage in going above 5 percent penta.

5—Germination results appear to be unaffected by the treatments. Three of the treatments and the control are considerably below 90 percent germination. The figure is considered satisfactory for seed purposes as immediately after harvesting, soybean seeds go through a dormancy period which lowers germination temporarily.

6—Pentachlorophenol residue tests are all below 1 ppm. with the exception of the 7½ percent penta oil solution which was 1.4 ppm. These are uniformly low.

Discussion of Results

If we can safely base recommendations to formulators on one season's tests such as just described there is no reason why we cannot use the formulation of an emulsifiable concentrate or emulsion concentrate of penta. This could be diluted with oil or water to make up a final 5 percent penta product by the user or applicator. Formulators will have to be sure that a fairly stable reliable type of emulsion concentrate is formulated. A poor unstable fast breaking emulsion would be sure to result in failures.

The volumes used are critical in many cases. Two gallons per acre would appear to be an absolute minimum application and this is possible only on weed free beans sown in the usual spaced rows. Weedy and solid drilled beans require three to four gallons per acre.

There is little to be gained in using concentrations of penta above 5 percent. The difference in effectiveness of concentrations above 5 percent is not great enough to warrant the extra cost—in fact, it is questionable if there is any real difference.

The volume rates of application in this year's tests were not planned to be variable although the data shows variations. However, several applications this year reveal that where weeds are prevalent or where beans were solid drilled, a rate of at least four gallons per acre is required. This, of course, doubles the cost of material when compared to the two gallon rate.

Farmer experience has also revealed that the chemical drying agent is best applied during relatively hot bright weather. Under these conditions, the bean leaves wilt in a few hours and the whole plant is soon dry and brittle. Subsequent wetting does not, of course, revive the plant so if a rain does fall it is of little consequence providing there has been a couple of days of hot bright weather following the application. *Hence it is recommended that close attention be paid to weather predictions when using the drying agent.* On the other hand, if the agent is applied during dull moist conditions it appears to lose its effectiveness and in some cases the crop has had to be resprayed.

Summary

1—A new practice called the chemical harvest drying of soybeans has been successfully adapted to soybean production. The operation involves the spraying of two to six gallons per acre of a pentachlorophenol formulation into mature but still succulent soybean crops. The purpose is to facilitate the early harvesting of the crop. Advantages which accrue from this operation are:

a—Higher yields are obtained as losses from shattering are reduced.

b—Advantage can be taken of higher early fall prices. As the practice becomes universal, this factor will be cancelled out.

c—Farm land sown to soybeans can be cleared and worked early enough in the fall to easily allow the seeding of winter cereal, pasture or green manure crops.

d—Some weeds are prevented from going to seed and further infesting farm lands.

e—A generally better quality of uniform soybean seed can be produced.

2—A special reference should be made to the relation between harvest drying and weedy crops.

In some seasons one of the main advantages in using harvest drying agents is the brittlizing and drying of weeds. In many regions this year, the soybeans are ripe and dry but heavy infestations of smartweed, pigweed and grasses will seriously interfere with normal harvesting operations. In such cases a chemical drying agent can be applied to dry and brittlize the green weeds so that harvesting is easily accomplished. One precaution to remember is that if the weeds are of the grassy type the volume applied will have to be materially increased.

3—Finally it is recommended that users of harvest dryers in soybeans pay special attention to weather conditions before applying pentachlorophenol and oil formulations. Best results are obtained if the chemical is applied when the temperature is 70° F. or above and during bright sunshine. Hence it is a sound practice to check the weather forecast before application.

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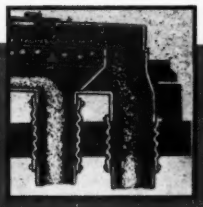

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New Developments in Beef Feeding

By WISE BURROUGHS

Animal Husbandry and Chemistry Departments,
Iowa State College, Ames, Iowa

WISE BURROUGHS

WE NEED soybean oil meal in beef fattening rations. Historically knowledge concerning the needs for supplying protein in balancing beef cattle rations developed in the teens about the same time as knowledge was being developed demonstrating the needs of protein supplement in swine and poultry feeds. These needs for protein supplements and their good qualities in livestock feeding were established prior to and during the infancy of the soybean oil meal industry.

Prior to about 1930 information concerning the vitamin requirements of animals and the vitamin content of respective feeds was largely lacking. During this time and to some extent up to the present time the good qualities derived from soybean oil meal and other protein supplements had been credited entirely to their protein content rather than the sum total of nutrients which of course includes protein but which also includes vitamins and other nutrients as well.

With the development of knowledge in the vitamin field the past two decades and more recently antibiotics, more and more attention in nutritional research has been focused on constituents in protein supplements other than their protein content. In some instances a majority of such efforts in nutritional research has been to find just what vitamins or other nutrients must be added to the protein supplement in order to make it a better complete supplementary feed. This is especially true in the case of soybean oil meal in swine and poultry nutrition.

It is very likely that a similar development would have taken place in cattle feeding during the past 10 or 20 years were it not for the fact that about this time we began to learn that the principles in ruminant nutrition of cattle and sheep differed somewhat from the principles involved in non-ruminant (swine and poultry) animals. Actually we have not made the progress in beef cattle nutrition with respect to improved utilization of supplemental feeds that has been true with swine and poultry. We do not have experiments with cattle showing how soybean oil meal, for example, can better be utilized with added ingredients such as vitamin B-12 and antibiotics similar to the information gained with non-ruminant animals. I do not apologize for this condition largely because our efforts in ruminant nutrition have by necessity been directed toward finding out why the principles in ruminant nutrition differed from those of non-ruminants. I should like to spend some time therefore in developing what we have recently learned about the principles involved in beef cattle nutrition from which it is hoped that many practical answers will eventually be derived in the future in practical beef feeding.

Rumen Makes the Difference

The part played by the rumen or paunch of cud-chewing animals is the primary factor which makes the principles in ruminant nutrition different. We have known for some time that a great deal of fermentation (bacterial growth) takes place in the rumen. This fermentation brings about major changes in the chemical composition of feeds consumed by cattle. One change involves roughage digestion. Rumen bacteria are the only means by which fibrous constituents of roughages can be digested and thus utilized by cattle and sheep. This facility for digesting fiber in hays and other roughages is almost non-existent in animals not possessing a rumen. In fact, cattle could not digest roughages to any appreciable extent if they did not have a rumen. It can be said that the very foundation of the cattle and sheep industries is dependent on the function possessed by rumen bacteria in digesting roughages so that they can be utilized and thus are valuable livestock feeds.

A second major feed transformation brought about by rumen fermentation involves amino acid and B vitamin synthesis. Much of the feeds entering the rumen are literally eaten by rumen bacteria before the feed has a chance to get out of the rumen and subjected to body enzyme action and utilization. As a consequence the chemical make-up of feeds leaving the rumen is different from that which entered the rumen. Some of these differences are the conversion of certain non-essential amino acids into essential amino acids. Thus we find that quality in protein feeds fed to ruminants is not a problem at all because rumen bacteria can make a good protein out of a so-called poor protein. This is indeed a valuable asset possessed directly by rumen microorganisms and indirectly by cattle and sheep.

The same can be said for the synthesis of B vitamin in the rumen. Apparently ruminants physiologically require the many factors contained in the B-complex the same as do poultry and swine but actually these requirements are satisfied by bacterial synthesis from simpler compounds found in the feed. No one has yet been able to produce a B vitamin deficiency in mature cattle which have normally functioning rumens. This is why cattle do not need vitamin B-12 and related vitamins.

Do Oil Meals Need Supplementing?

Since cattle through their rumen microflora can transform a protein with a poor amino acid make-up into a protein with a

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good amino acid make-up and since B-12 and other B vitamins need not be added to a cattle supplement, then we can logically ask the question: Is there any supplementary ingredient which might be added to a beef cattle supplement such as soybean oil meal which would improve it in any way?

About the only experimental evidence showing promise that there was something to be gained by feeding a more complex supplement than straight soybean oil meal was obtained in Ohio the past two years in which poor quality hay was purposely included in a heavy corn-fattening ration. Ten lots of cattle were fed two years ago for 224 days in which the check lot received 1½ pounds of solvent soybean oil meal per steer per day. The other lots received the same amount of protein per steer per day in which additions or substitutions were made to the soybean oil meal check lot as follows:

Lot 1—(Check) One and one-half pounds of solvent soybean oil meal, 44 percent protein, per steer per day. A.D.G. 1.85

Lot 2—A supplement that supplies five-sixths of the protein from soybean meal and one-sixth from meat scraps. A.D.G. 1.81

Lot 3—A supplement that supplies four-sixths of the protein from soybean meal and two-sixths from meat scraps. A.D.G. 1.87

Lot 4—A supplement that supplies three-sixths of the protein from soybean meal and three-sixths from meat scraps. A.D.G. 1.80

Lot 5—A supplement in which two-thirds of the protein is from soybean meal and one-third from dehydrated alfalfa meal. A.D.G. 1.91

Lot 6—A supplement in which one-third of the protein is from soybean meal and two-thirds from dehydrated alfalfa meal. A.D.G. 1.88

Lot 7—All dehydrated alfalfa meal as the protein supplement. A.D.G. 2.09

Lot 8—A supplement in which one-third of the protein is from each of soybean meal, meat scraps, and dehydrated alfalfa meal. A.D.G. 1.99

Lot 9—A supplement in which one-fourth of the protein is from each of soybean meal, meat scraps, dehydrated alfalfa meal, and urea. A.D.G. 1.76

Lot 10—A supplement in which three-fourths of the protein is from soybean meal and one-fourth from urea. A.D.G. 1.69

The average daily gain of 1.85 pounds in the soybean oil meal check lot was not improved by mixing different amounts of meat scraps (lots 2, 3, 4) in the soybean oil meal. Adding dehydrated alfalfa meal to soybean oil meal or using all alfalfa meal (lots 5, 6, 7, 8) increased gains over the check lot even though ample vitamin A and a mineral box was supplied in the straight soybean oil meal lot. Urea additions (lots 9, 10) to soybean oil meal failed to be as effective as straight oil meal.

In the second year experiment conducted last year, poor-quality hay was again used and a check lot was fed all the ground ear corn they would consume in a 210-day feeding trial in which an average of 1½ pounds of soybean oil meal was fed per steer per day. The additions or substitutions for soybean oil meal along with the average gains in each of the other nine lots are presented as follows:

Lot 1—(Check) One and one-half pounds of solvent soybean oil meal, 44 percent protein, per steer per day. A.D.G. 1.81

Lot 2—Same as Lot 1 plus 1 pound cane molasses per steer daily. A.D.G. 2.13

Lot 3—Same as Lot 1 plus 2.8 ounces of a complex mineral mixture daily per steer. This is mixed with the soybean oil meal. A.D.G. 2.07

Lot 4—Same as Lot 1 plus the ash, 2.7 ounces, obtained by burning 1.75 pounds of dehydrated alfalfa leaf meal daily per steer. This is mixed with the soybean oil meal. A.D.G. 2.19

Lot 5—Dehydrated alfalfa leaf meal, 19 percent protein. A.D.G. 2.28

Lot 6—One-half of protein from each of soybean oil meal and dehydrated alfalfa leaf meal. A.D.G. 2.09

Lot 7—One-half of protein from each of soybean oil meal and meat and bone scraps—50 percent for 100 days, then 62½ percent. A.D.G. 1.89

Lot 8—One-half of protein from soybean oil meal and one-half from dried distillers' solubles, 23.2 percent protein. A.D.G. 1.97

Lot 9—One-fourth of protein from each of soybean oil meal, dehydrated alfalfa meal, meat scraps, and a dried distillers' solubles. A.D.G. 1.89

Lot 10—Same as Lot 9 plus 1 pound of cane molasses daily per steer. A.D.G. 2.26

The control ration again did relatively poor (A.D.G. 1.81) similar to that of the year previously. Also the addition of meat scrap to soybean oil meal (lot 7) failed to be helpful whereas alfalfa meal (lot 5) materially stimulated gains. This stimulation in gains was also obtained when alfalfa meal was burned and the ash of alfalfa meal added to soybean oil meal (lot 4). Adding a complex mineral mixture to soybean oil meal (lot 3) gave improvement over the check lot which had access to a simple mineral mixture. However, the stimulation from the complex mineral mixture was not as great as the alfalfa ash. Two other ingredients which gave stimulation in gains while feeding the poor quality hay in fattening rations were dried distillers' solubles (lot 8) and blackstrap molasses (lots 2 and 9).

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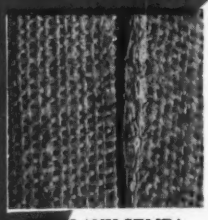

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More feedlot information needs to be obtained before any of the above findings can be translated into recommendations for feeding practice. It should be kept in mind that poor quality hay was used in these experiments and there is evidence to suggest that the results might not be the same were a good quality hay used. This is suggested by the stimulation in gains when dehydrated alfalfa meal was mixed with soybean oil meal. Nevertheless many times in practice we are forced to use poor quality hay and it appears significant that under these conditions that *there may be real justification for supplementing soybean oil meal and perhaps other oil meal in developing the most satisfactory supplement in beef cattle fattening rations.*

Possibilities in Complex Supplements

In research work we are always asking the question as to why things work as they do. Why did we get stimulation in gains when we added alfalfa meal, ash of alfalfa meal, molasses and complex minerals? We earlier said that the steer's rumen microorganisms could transform a protein with a poor amino acid make-up into a good protein with a superior amino acid content. Further it was pointed out that cattle do not require vitamin B-12 and other B vitamins in the feed since their rumen microorganisms synthesize these materials. Why then isn't a simple protein supplement just as effective as a more complete protein supplement? Why isn't one protein supplement just as effective for cattle even when poor quality hay is fed? The answer to these questions appears to lie in the fact that although rumen microorganisms can do a good job in digesting roughage and synthesizing amino acids and vitamins under favorable conditions, they are not able to do these things efficiently under unfavorable conditions.

Favorable conditions for rumen microorganisms mean we must feed these bugs properly the same as we must furnish plenty of feed for cattle and other farm animals. In order to learn what nutrients rumen microorganisms need it has been necessary to take these tiny creatures from the steer and place them in artificial rumens in the laboratory.

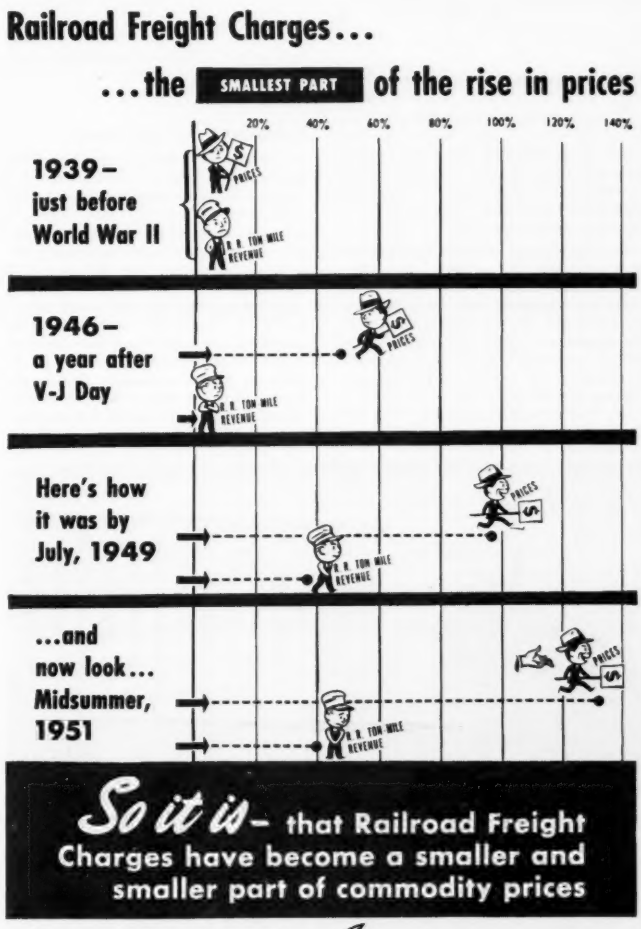
These artificial rumen studies indicate that rumen microorganisms have three major nutrient requirements. The first pertains to energy, a large part of which can be cellulose and roughage constituents. However, there is advantage in supplying at least small amounts of readily available carbohydrates such as starch of grains or sugars as found in certain roughages and by-product feeds.

The second major nutrient requirement of rumen microflora is that of ammonia or the degradation products of proteins. One protein appears about as valuable to the growth of rumen bacteria as another since it is the ammonia content of proteins which they are interested in rather than the amino acid make-up. This is why ruminants can make good use of urea. The urea consumed is food for rumen bacteria. They transform it into protein which the steer later digests and makes use of.

The third and final nutrient requirement of rumen microorganisms is a complex variety of minerals. The minerals as found in young growing plants such as alfalfa meal are particularly potent in stimulating the activity of rumen fermentation. This is true of certain complex mineral mixtures and the ash of molasses. This probably explains why, when the roughage quality is poor in a fattening cattle ration, improvement in cattle gains was obtained when alfalfa or its ash or when molasses was added to the soybean oil meal supplement. More information concerning the mineral needs of rumen microorganisms is needed before specific recommendations can be made. It appears that too much of certain trace elements can be just as harmful in some cases as not enough.

We are not certain as yet whether antibiotics have any place in fattening cattle rations. To date they have not looked very good experimentally for beef cattle.

At the present time our thinking in beef cattle nutrition can be summarized rather simply. In compounding rations for cattle it is necessary to furnish nutrients for both the cow or steer and at the same time the nutrients required by rumen microorganisms. The needs for special supplements for rumen microorganisms are not fully known. However, these needs are more critical in the absence of good quality roughages. Where good quality roughages are not fed to fattening cattle it may be advisable to make additions to a simple protein supplement such as soybean oil meal for cattle.



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N. L. JACOBSON

SOYBEANS AND SOYBEAN PRODUCTS IN

Dairy Cattle Feeding

By N. L. JACOBSON

Associate Professor, Dairy Husbandry, Iowa State College, Ames, Iowa

THE INTRODUCTION of soybeans into American agriculture was a major contribution to dairy cattle nutrition. When harvested for seed, soybeans provide an excellent source of protein for concentrate mixtures and when harvested in the immature state, they can be used as an emergency forage crop when supplies of other legumes are inadequate.

Soybean oil meal is the soybean product most commonly used in dairy rations. Under some circumstances, however, raw soybeans are a practical and economical component of the diet of dairy cattle. With the exception of the young calf, the dairy animal normally has a well-developed fermentation vat (rumen) where microorganisms synthesize a variety of amino acids from which proteins are built. For the ruminating animal, therefore, protein quality is not so important as for "single stomach" animals such as swine, and the heating employed in soybean oil meal production is not necessary to make soybean protein of maximum value to ruminants. Thus, ground or cracked soybeans frequently are included in the concentrate mixtures of dairy cows. Experimentally more than eight pounds of raw soybeans per cow daily have been fed with satisfactory results over relatively long periods of time.

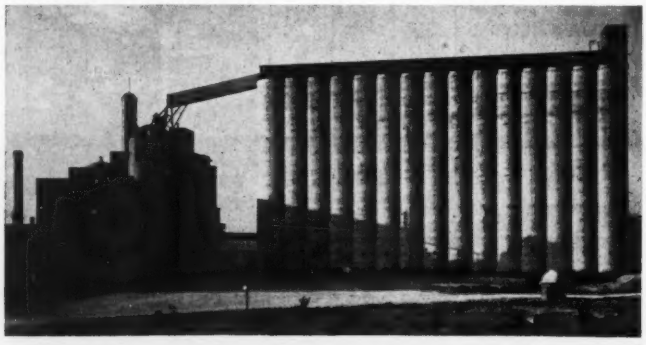
Drawbacks of Soybeans

There are, however, certain disadvantages occasionally encountered in using raw soybeans in dairy cattle rations. In the young dairy calf, where rumen function is not fully developed, soybean oil meal protein may be more valuable than that of raw soybeans. Moreover, raw soybeans when fed in large quantities are somewhat less palatable, particularly to the young animal, than the oil meal. Since it has been demonstrated that inclusion of raw soybeans in the ration of dairy cattle tends to depress the vitamin A activity both of the blood and of the milk, difficulties may be encountered if the beans are fed at a high level and if the animals are maintained on a comparatively low carotene ration. This effect also has been demonstrated with soybean oil meal but the changes produced seem to be of lesser magnitude.

Feeding soybeans also tends to produce a softer butter but has no adverse effect on the flavor of milk. Another important factor in determining whether soybeans should be fed to dairy cows is the market value of soybean oil. Frequently it is more economical for the farmer to sell his soybeans and purchase soybean oil meal for use as a high-protein supplement in his dairy ration.

Soybean oil meal has become a common ingredient in the concentrate mixtures of dairy cattle of all ages. In experiments at the Iowa Agricultural Experiment Station a calf starter composed of cracked corn, 40 percent; crushed oats, 30 percent; soybean oil meal, 28 percent; steamed bone meal, 1 percent; and salt, 1 percent has produced excellent results. In the rations of older animals soybean oil meal is adequate as the only high protein supplement. Since dairy cows produce slightly more milk when fed a concentrate mixture containing approximately 4 percent fat than when fed a mixture containing less fat, expeller process (and hydraulic process) soybean oil meal is somewhat more valuable than that made by the solvent process if the other components of the ration are extremely low in fat content. In most instances, however, sufficient fat is available so that no differences are apparent among the various soybean oil meals.

For many years research workers have been investigating the possibility of using various crude vegetable oils as sources of fat in the diet of the young calf. In most instances the results have been discouraging and the experiments with soybean oil were no exception. Incorporation of the crude oils in calf rations usually has resulted in unthriftiness, excessive scouring and poor growth. There are indications, however, that these adverse effects can largely be eliminated by hydrogenation of the oil. Hydrogenated soybean oil, in contrast to the crude product, can be used successfully at levels at least as high as 3 percent in "filled" milks and certain other whole milk replacements. Nevertheless, since there are indications that calves grow well on rations extremely low in fat, further experimental work is needed to ascertain the role of fat in the diet of the young calf. There are certain obvious advantages



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in the formulation of low-fat whole milk replacements, provided an adequate energy intake is supplied and adverse effects such as scouring are minimized.

Although the growth and efficiency of feed utilization of swine and of poultry fed diets containing only vegetable proteins is improved by B-12 supplementation, dairy animals apparently do not respond similarly. On the other hand, the growth rate of young calves can be increased by the inclusion of certain of the antibiotics in the diet. Moreover, there are indications that antibiotics also reduce incidence of diarrhea and improve condition of haircoat of calves. Much more research is necessary, however, to clarify fully the role of antibiotics in dairy cattle nutrition.

One factor sometimes overlooked in the feed industry is the importance of good quality roughage for the continued successful use of mixed feeds in the dairy industry. Although there still are many problems in the production and utilization of high-quality roughages, there is no doubt of the essentiality of good forages in successful dairy cattle feeding. Good quality roughages supply vitamin A activity, and when sun-cured, they also provide vitamin D. These two vitamins are of primary importance in dairy cattle nutrition, and good rations normally should supply adequate amounts except in the case of the young calf, where supplemental feeding of vitamins A and D is sometimes necessary.

Good quality legume forage also is a good source of calcium but is comparatively low in phosphorus. Inclusion in the concentrate mixture of one or more oil meals or grain by-products rich in phosphorus tends to correct this dietary imbalance. It is a common practice in feed formulation to include calcium and phosphorus supplementally. This practice is not without danger, however, since there is a tendency to include excessive amounts of calcium (in proportion to phosphorus) because this element is relatively inexpensive. The high cost of phosphorus supplements has in some instances resulted in supplementation at a comparatively low level or the use of phosphorus supplements which contain impurities such as fluorine which may be present in amounts sufficient to be injurious to the animal. Since the phosphorus content of soybean oil meal is lower than that of wheat bran, cottonseed meal and linseed meal, special attention should be given to phosphorus supplementation if the concentrate mixture is composed largely of soybean oil meal and grains.

Trace Minerals

There is considerable debate relative to the routine inclusion of trace mineral supplements in feeds for dairy cattle. Strong arguments can be presented both for their inclusion and for their omission. In any event, it is important to remember that excesses, as well as deficiencies, of certain of these elements may cause difficulties. For example, too much iron in the ration tends to interfere with phosphorus absorption through the formation of an insoluble phosphate.

Other factors which must be considered in determining the exact composition of a mixed feed are relative cost and availability of the various possible ingredients and palatability. In feeding soybeans and soybean products to dairy cattle, palatability usually is not a problem. This is particularly true for soybean oil meal. The importance of certain physical factors should not be overlooked, however. For example, if all of the ingredients of a concentrate mixture are finely ground, the palatability of the feed may be affected adversely. Moreover, variety, which often receives undue emphasis, will insure neither palatability nor high physiological value.

Much is yet to be learned in the field of dairy cattle nutrition. Many potentially fertile areas of study are just now beginning to receive attention and still others are as yet untouched. Until more information is available through experimentation, however, the knowledge available must be used to the best of our ability. To insure continued success, those engaged in the processing and merchandising of feeds for livestock must present to the farmer products which will maximize the returns from his enterprise. In determining the usefulness of any one feed or feed ingredient it is necessary to consider the entire dietary regime and all relevant managemental factors.

Research Increases Soybean Oil Meal Utilization in Poultry Feeds

By ELTON L. JOHNSON
Iowa State College

CHICKENS are rapidly becoming vegetarians. This transition is taking place as the result of our increased knowledge in supplementing the protein provided in the form of soybean oil meal.

The recognition of soybean oil meal as a high quality protein did not occur overnight. Millions of dollars have been spent in research on the production and utilization of soybean oil meal as a feed. This discussion will include some of the more pertinent facts regarding soybean oil meal as a source of protein for poultry.

Most of the progressive research with soybean oil meal as a poultry feed ingredient was conducted in the period of protein feed shortage which occurred during World War II. Research demonstrated the need of supplementing a combination of corn and soybean oil meal with minerals and vitamins. It was also evident that the heat treatment of the meal after oil extraction would also affect the response obtained with rations containing appreciable amounts of soybean oil meal.

Early studies with combinations of soybean oil meal and animal proteins such as dried milk, meat scrap, and fish meal, indicated the animal proteins would promote a more rapid growth rate in chicks. Further studies showed the animal proteins were good sources of the minerals, calcium and phosphorus, and vitamin B-2 which was at that time known as vitamin G.

Although the addition of calcium, phosphorus, and vitamin B-2 (riboflavin) improved the growth of chicks the combination of animal proteins remained superior in promoting chick growth. A simple solution to the difference between a soybean meal ration and one containing animal proteins was not available.

Some research investigators felt the animal proteins were more satisfactory because of protein quality. They believed the animal proteins contained a more desirable balance of amino acids which are the individual compounds in the complex material we refer to as protein.

A few research workers believed the animal proteins contained greater amounts of one or more unknown vitamins than did soybean oil meal. This belief was strengthened as means of determining the amino acids in feed ingredients were developed. Soybean oil meal was found to have a relatively satisfactory balance of amino acids when compared with dried milk or meat and bone scrap.

The evidence for unknown factors was very strong when a small amount of condensed fish solubles caused marked increases in chick growth. An example is given in table 1. Dried cow manure was shown as early as 1945 to be effective in supplementing a vegetable ration for chicks (see reference 6).

DR. ELTON L. JOHNSON

Table 1. Fish press water improves soybean meal ration*

Ration	Average weight of chicks
Basal (soybean oil meal protein)	321
Basal + 2% fish press water	474

*See reference number 1

The term "animal protein factor" was used to designate the unknown vitamin, or vitamins, which occurred in feeds of animal origin. In 1948 commercial fermentation procedures resulted in feeding supplements high in animal protein factor (APF) activity. These commercial products were very effective in supplementing a corn-soybean oil meal diet for chicks as demonstrated in table 2.

Table 2. APF concentrate improves vegetable ration for chicks*

Ration	Average weight at 8 weeks
Basal	1.5 lb.
Basal + 0.5% APF	1.8 lb.
I.S.C. Broiler Ration	1.8 lb.

*See reference number 2

The isolation of vitamin B-12 and work with this new vitamin showed it to be the major nutrient associated with the term animal protein factor. The importance of this vitamin in producing hatching eggs is indicated in table 3.

Table 3. A vegetarian diet promotes high hatchability when supplemented with vitamin B-12*

Ration	Fertile eggs set	Percent hatch
Basal (soybean protein)	345	46.7
Basal plus vitamin B-12	686	90.4

*See reference number 3

Experimental results, such as given in table 4, indicate there may be additional unknown vitamins in milk products which need to be included in vegetable rations.

Table 4. Whey and fish solubles provide unknown factors for chicks*

Ration	Average weight at 8 weeks
Basal (soybean protein)	545
Basal + vitamin B-12 supplement	755
Basal + B-12 + dried whey	855
Basal + condensed fish solubles	852

*See reference number 4

Antibiotics such as aureomycin and penicillin are effective in supplementing a corn-soybean meal ration. Details will not be discussed as this action is similar for animal protein rations as well as those containing only soybean oil meal.

Members of the livestock feeding panel: l to r, Dr. Damon Catron, Dr. Wise Burroughs, Dr. Elton Johnson, Dr. Norman Jacobson, all of Iowa State College, and C. Kenneth Shuman of the Glidden Co.

One of the early discoveries involved the heat treatment of soybean oil meal to improve its nutritive value. The technique of determining in a few hours time whether a meal is properly heated remains a major problem, both to the processor of the meal and the feed manufacturer.

We have been working on this problem at Iowa State College, using a combination of rapid laboratory tests and the slower biological test involving chick growth. Results to date indicate the measurement of urease activity and fluorescing properties of solvent-extracted meal are good estimates of the adequacy of the heat treatment. Examples of meals with different nutritive values are listed in table 5. The reduced value due to overheating is due to the destruction of lysine.

Soybean oil meal will continue to play an important role in the feeding of poultry. The discovery of additional nutritive factors to supplement a properly prepared meal will eventually lead to its widespread use as the sole protein concentrate in poultry feeds.

Table 5. Effect of heating on quality of soybean oil meal*

Meal treatment	Average weight of chicks in grams	Urease value	Fluorescence	Lysine %
Underheated	223	5.05	25.6	2.59
Properly heated	298	0.21	29.4	2.58
Overheated	185	0.12	93.0	1.70

*See reference number 4

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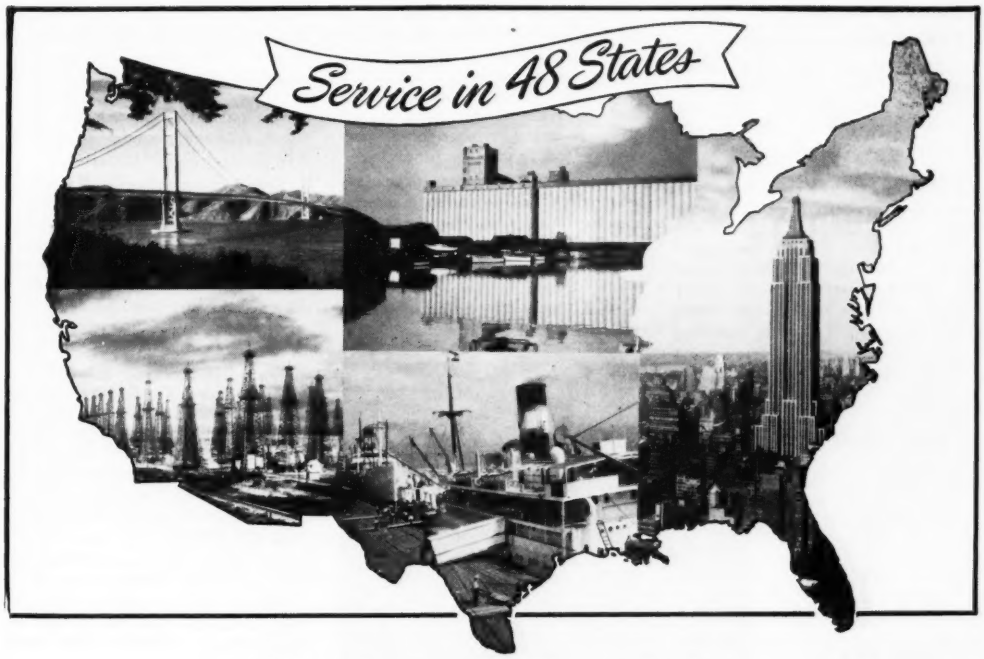

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STORAGE BENEFITS EVERYBODY

Storage of soybeans on farms, rather than immediate sale at harvest time, can benefit growers, handlers, crushers, and consumers of oilseed products, and help in the mobilization effort, the Department of Agriculture says in a report based on a study of soybean marketing practices.

Storage offers farmers the opportunity to increase their earnings on the soybean crop. It means lower operating costs for soybean handlers, crushers and product manufacturers, through reduced congestion at elevators, reduced price risk, lower-cost financing of inventories, and transportation savings. Consumers may share in these cost savings through lower prices than would otherwise apply on shortening, margarine, feeds, and other products.

In most years, soybean prices are seasonally low during harvest months, it was found by the Department's Production and Marketing Administration, which made the study. Within a few months after harvest, the price ordinarily moves considerably higher, returning extra profits to the farmers who stored. Soybean prices have followed this typical pattern every crop year (October through September, since 1928 or earlier, except in the war years of price controls (1942-46) and those of a declining general price level (1930, '31, '37, '48).

Usually most growers sell the crop at harvest time and the heavy fall sales help depress prices, the study shows. However, for the four-year period 1946-47 through 1949-50, net earnings from storing soybeans from October till spring would have averaged 15 percent of the October value of the four crops.

Cost of farm storage is low, the report continues. Total cost of storage for nine months, including shrinkage, is less than 7 percent of the price at harvest time, whereas the rise in soybean price from harvest time to spring months averaged over 20 percent during the four postwar crop years.

The study was made by the fats and oils branch of PMA with funds made available under the Research and Marketing Act. The report not only explains advantages and disadvantages of storing the crop on the farm, but also describes problems of storage, ways of meeting them, and costs involved.

A copy of the report, "Improving Soybean Marketing Through Farm Storage," may be obtained from the Office of Information Services, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C.

—sbd—

OIL CHEMISTS MEETING

Events on the calendar of the American Oil Chemists' Society include the fall meeting in Chicago at the Edgewater Beach Hotel, Oct. 8-10, with field trips on the 11th, and a short course on soaps and synthetic detergents in 1952, probably in the East.

C. E. Morris of Armour and Co. will be chairman of the Chicago meeting, assisted by the following program committee: H. T. Spannuth, Wilson and Co., chairman; G. J. Stockmann, Wurster and Sanger, Inc., engineering and processing; E. W. Colt, Armour Soap works, soap and detergents; H. C. Black, Swift and Co., drying oils; and K. F. Mattil, Swift and Co., nutrition. Assisting Dr. Black will be Francis Scofield, National Paint, Varnish, and Lacquer Association, Washington, D. C.

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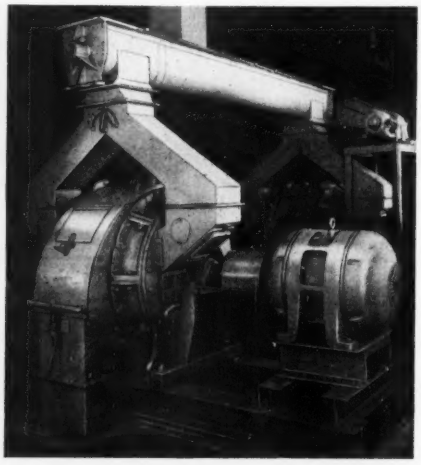

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PRATER PULVERIZERS

Chicago Opens Trading in Bean Meal

In response to an urgent demand from feed manufacturers and soybean processors, the Chicago Board of Trade initiated trading in soybean oil meal futures contracts, effective Aug. 29.

Soybean oil meal is one of the two main products resulting from the processing of raw soybeans. The production of soybean oil meal is now more than 500 times as large as in 1925. In that year, it was slightly over 8,000 tons—in 1950, it was more than 4.5 million tons.

By comparison with other high protein feeds, the production of soybean meal and cake last year was more than double that of cottonseed and about eight times greater than that of linseed meal.

Chicago and the Chicago Board of Trade are located right in the very heart of the area that harvests nearly three-quarters of all the soybeans grown in the United States—in this same area, nearly two-thirds of the soybean processing plants of the country are located.

This section is the primary source of supply for the soybean oil meal used in the manufacture of millions of tons of animal and poultry feeds and likewise, the source of supply for the millions of pounds of soybean oil used in the manufacture of margarine and other similar products.

With this background, it was only natural that the growers, industries and handlers looked to the Chicago Board of Trade to make provision for futures trading in soybeans themselves and in their two products. With this inauguration of futures trade in soybean oil meal, hedging opportunities in the raw commodity and in its two products as well will now be available in a centralized market place. Trade in soybean futures was started in late 1936 and in crude soybean oil in mid-1950.

The soybean oil meal futures contract calls for a trading unit of 100 tons and price fluctuations will be recorded in units of 5 cents per ton. Delivery will be accomplished through the tender of "demand certificates". Processing plants located in Decatur, Kankakee and Gibson City, Ill., and in Clinton, Iowa, are qualified as regular for delivery on Chicago Board of Trade soybean meal futures contracts and additional points will be added from time to time as the economic need materializes.

—sbd—

CEA SETS LIMITS ON FUTURES TRADING

Limits on speculative trading in soybean futures have been established by the Commodity Exchange Commission, effective Oct. 1, the U. S. Department of Agriculture has announced.

Under the order of CEA, the maximum net long or net short position that any person may hold or control is 1 million bushels in any one soybean future or in all soybean futures combined on any one contract market.

The Commission also fixed 1 million bushels as the maximum amount of soybean futures that any person may buy or sell on any contract market during one business day.

The limits apply to all speculative trades and positions, including spreading, in soybean futures on contract markets. They do not apply to bona fide hedging transactions.

The Commodity Exchange Com-

Here is the initial trade in soybean oil meal futures on the Chicago Board of Trade, between S. J. Meyers, first vice president of the Exchange (right) and Richard F. Uhlmann, former president of the board. It involved 100 tons of meal for November delivery at $57 a ton.

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mission, composed of the Secretary of Agriculture, the Secretary of Commerce and the Attorney General, is authorized under the Commodity Exchange Act to fix limits, after due notice and hearing, on the amount of speculative trading by any person in any commodity covered by the act.

Hearings under the Commodity Exchange Act to consider the establishment of speculative limits for soybeans were held in Washington, D. C., on Feb. 5 and 6, and Apr. 2, 1951. Speculative limits for grains and cotton have been in effect since 1938 and 1940, respectively. Such limits are enforced by the Commodity Exchange Authority.

J. M. Mehl, administrator of the Commodity Exchange Authority, said the orders of the Commission for soybeans will not apply to market positions acquired by traders in good faith prior to the effective date of the orders.

Mehl also pointed out that the Commission's order specifically provides that the fixing of speculative limits does not affect any provision of the Commodity Exchange Act relating to price manipulation or corners, nor relieve any contract market of its responsibility under the act for preventing manipulation and corners.

SOYBEAN FESTIVAL AT PORTAGEVILLE, MO.

"King" Soybean will rightfully come into his own down in Old King Cotton's backyard for five days at the fourth annual National Soybean Festival in Portageville, Mo., Sept. 25-29. "Southeast Missouri's Grand Party," as it is known, is sponsored each year by the local Junior Chamber of Commerce.

Events will include parades, a carnival, concerts, turtle races and the most popular of them all, the selection and crowning of the 1951 national soybean queen. Over $1,500 in prizes will be awarded this year.

PAT WEBER

A junior soybean queen will also be selected from baby girls between the ages of three to five.

The queen's float parade Thursday evening, Sept. 27, will honor the 1950 queen, Pat Weber, Poplar Bluff, Mo.; and the 1951 queen will be chosen Friday evening.

The Jaycees have an additional sporting event this year, the "soybean turtle derby handicap," with 50 turtles entered.

For additional information on the festival contact the Junior Chamber of Commerce, Portageville, Mo.

—sbd—

NEW MILL BY SWIFT

A new source of livestock feed will soon be available to Iowa farmers and feeders.

A new mixed feed mill now under construction by Swift & Co. at Des Moines will be completed and ready for operation Jan. 1, C. D. Whitaker, manager, announces. The mill, located next to the Swift soybean oil meal plant, will process a varied line of livestock and poultry feed.

Construction of the feed mill in Des Moines is a part of Swift's increasing interest in better livestock nutrition, according to Whitaker. The company maintains a staff of nutrition research scientists in their central laboratories, and also operates a research poultry farm at Clinton, Iowa.

—sbd—

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Conditions Spotted in Soybean Belt

More rain than normal continued to fall in the part of the soybean belt west of the Mississippi River during August. Yield on the average looks good in this area, but is somewhat spotted and some late planted fields may not mature.

Prospects in Illinois and Indiana are for another bumper crop, even above the record one of last year.

But drouth developed in Ohio and in Louisiana and Mississippi.

Most reporters are inclined to place the acre average and total yield under 1950.

There are plenty of weeds in some sections. Diseases and pests are probably not above average.

More farm and elevator storage has been built this season. Less wheat and other grain occupies the storage. Outlook for handling of the crop seems fairly good at this stage.

Harvest of early varieties is starting in late August and early September in some sections.

A 1951 production of 270 million bushels is indicated from Aug. 1 conditions, reported the U. S. Department of Agriculture crop reporting board Aug. 10. This is the second highest production on record, being exceeded only by last year's 287 million bushels. The indicated yield of 20.6 bushels per acre is 1 bushel less than last year.

Alabama

H. I. West, Bay Minette, for southwest (Aug. 26): Maturity of crop normal. Weather and moisture conditions good. Per acre yield 20 percent higher than 1950. Total yield 25 percent higher. Very little damage from weeds. Army worm universal. Not enough storage. Prospects 15 percent farm storage. Farm storage up. Elevator about same. Crop outlook best have had. Beans excellent all over territory. Believe we have highest concentration of beans of any place in U. S. 65 percent of our crop acres in beans, due mostly to use as second crop.

Arkansas

Keith Bilbrey, county agent, Blytheville, for Mississippi County: Maturity near normal. Hot weather last 5 weeks helped maturity. Weather and moisture conditions good. Think crop will mature with Nov. 1 frost date. Per acre yield may be 2 bushels short of last year. Total yield may be 65-70 percent of last year's total. Weed control good enough except in rare cases. Bean beetles pretty bad, particularly in late beans. Some poisoning.

L. M. Humphrey, R. L. Dortch Seed Farms, Scott, for Little Rock area (Aug. 24): Maturity of crop normal except for very late planted beans. Except for some excessive heat in July and early August conditions very favorable. Per acre yield outlook a little lower than 1950 because of some late planting and weeds in some fields. Total yield about 80 percent of 1950 due to reduced acreage in favor of cotton. Some new storage built.

Jake Hartz, Jr., Jacob Hartz Seed Co., for south and southeast (Aug. 24): Maturity 10 days later than normal. Weather rather cool. Moisture in north half of section only. Dry in southern half. We expect average yield to be 5 bushels less than 1950 and total yield 25 percent less. Weed control no problem, however grass rather bad. Facilities for crop movement should be adequate except at peak. Will be less storage for soybeans as rice acreage increase some 15 percent.

Illinois

Russell S. Davis, Clayton, for west central (Aug. 25): Maturity of crop well advanced. Weather and moisture conditions almost perfect. 11 inches rain during month. Per acre yield outlook about same or higher than 1950. Weed control not so good. Considerable brown stem rot and more grape colapsis than for some years. Local storage plentiful. Transportation questionable. Light oat crop and wheat moved into commercial channels should leave more than average farm and elevator storage.

Albert Dimond, Lovington, for Moultrie County (Aug. 23): Maturity of crop a good week ahead of normal. Weather and moisture conditions adequate. Per acre yield as good or better than 1950. Total yield possibly a little below 1950. Reduced acreage. Weed control generally fair to good. Farmers are gradually learning storage pays off and trend has been to increase it. Some interest in advance sale and some sold $2.50 to $2.56.

J. C. Hackleman, extension specialist, University of Illinois, Urbana (Aug. 24): Maturity of crop normal. Weather and moisture conditions almost perfect last few weeks. Floods in June destroyed beans in some areas. Weed control just fair. Too much rain in June to control weeds completely. Farm and elevator storage equal to if not greater than last year. Wheat crop smaller and probably not as much storage space occupied by wheat.

J. E. Johnson, Champaign, for Champaign and adjoining counties (Aug. 24): Maturity week in advance of 1950 crop, up to and above our early harvest years. Moisture better than normal. Good rains over territory Monday.

Have smallest percentage of late seedling of any year for five years. Expect harvesting to start at least week earlier than 1950. Yield could average 1 to 3 bushels higher than 1950. Acreage reported 9 percent less than 1950. Would expect total yield to be up to 1950. Fields weedier than 1950. Worst is wild millet that delays harvesting. Leaf diseases rather prevalent early part of season. None now. Additional storage built by local elevators. Only a few places where they cannot store all beans offered.

Robert W. Weitzer, Valley Farms Co., Carrollton, for west central (Aug. 25): Maturity will be slightly later than usual. Weather cool and abundant moisture. Ought to be about 10 percent increase in per acre yield. Beans terribly weedy. Chemical defoliant in great demand. Crop

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should move in orderly fashion due to range of maturity of different varieties.

C. G. Simcox, Assumption, for south central (Aug. 28): Maturity of crop normal. Immediate vicinity 5 by 15 miles no rain since June 28 until today. Beans and corn exceptionally good under conditions. Per acre and total yield prospect 100 percent of 1950.

Indiana

Peter J. Lux, state PMA, Indianapolis (Aug. 24): Crop 10 days earlier than normal. Weather and moisture conditions good. Prospective per acre yield 24 bushels compared with 21 bushels in 1950. Will be lots of beans in government bins rented by farmers.

J. B. Edmondson, Danville, for south central (Aug. 28): Maturity of crop normal or a few days ahead. Some fields beginning to turn yellow. Weather has been about ideal all way through. Enough moisture now to mature crop. Would raise 1950 yield 4 to 5 bushels. Vines unusually high. Probable increase of 8 to 10 percent total production. Frequent rains fore part of season gave weeds a start. Are showing up pretty badly now. Pigweeds, ragweeds and jimson. We expect to move or store crop without difficulty. More farm bin room is slowly materializing.

George K. Black, J. A. McCarty Seed Co., Evansville, for southwestern (Aug. 27): Maturity of crop normal to little early. Weather and moisture conditions excellent. Some areas could use rain. Early varieties beginning to turn. Total yield about 5 to 10 percent above 1950. Fields look very clean. A large foxtail-millet-type grass is becomming quite obnoxious. A new "topper" for cutting tops of giant ragweed and pigweed has been reported in territory.

Iowa

Fred Hawthorn, Castana, for western (Aug. 25): Maturity of crop 10 days late. Excessive rains. Per acre yield 20 percent below 1950. Total yield prospect about same as 1950. Outlook for crop movement normal. Farm and elevator storage about same as last year.

Kansas

Agricultural statistician, Topeka, (Aug. 22): Soybeans in major producing areas 60 percent podded. Weather and moisture conditions favorable recently. Late plantings will need considerable warm weather to mature beans. A few fields planted as late as mid-July. Per acre yield outlook 11 bushels compared with 18 in 1950. Some fields weedy.

G. C. Wareham, Thomson Soya Mill, Hiawatha, for northeast (Aug. 23): Maturity for 75 percent of crop good. Balance late planting and will not get full growth before maturing. Moisture supply abundant. Nights cool and cloudy. Total prospective yield one-third of 1950. Weed control not too good due to ideal weed growing weather and plenty of moisture.

E. A. Cleavinger, extension specialist, crops and soils, Kansas State College, Manhattan, for eastern (Aug. 23): Maturity of crop normal. Weather and moisture conditions excellent. Per acre and total yield outlook 90 percent of 1950. Crop not as free of weeds as last year.

Kentucky

A. J. Reisz, Henderson, for western Kentucky and southern Indiana (Aug. 27): Maturity of crop 7 days early. Severe dry weather. Slow rain today. Per acre and total prospective yield 10 to 20 percent short of 1950. Some 2,4-D being used in weed control.

SOYBEANS FOR BEANS*

State	Yield per acre			Production		
	Average 1940-49	1950	Indicated 1951	Average 1940-49	1950	Indicated 1951
	Bushels			Thousand bushels		
N. Y.	15.3	18.0	16.0	154	108	144
N. J.	15.7	19.0	18.0	174	266	252
Pa.	15.4	17.0	17.0	359	289	255
Ohio	19.6	22.0	22.5	18,552	23,232	24,728
Ind.	18.9	22.0	23.0	25,013	35,002	36,800
Ill.	21.4	24.0	24.5	68,424	94,752	86,534
Mich.	17.0	19.5	20.0	1,593	2,282	2,300
Wis.	14.3	14.5	16.5	497	348	330
Minn.	15.5	15.5	17.0	7,221	16,384	18,241
Iowa	19.9	22.0	20.0	30,709	42,262	31,540
Mo.	15.8	23.0	18.0	9,730	27,393	23,778
N. D.	†11.1	10.5	13.5	†86	430	378
S. D.	14.0	12.5	16.0	260	825	976
Nebr.	16.8	24.0	20.0	436	1,104	920
Kans.	11.7	18.0	11.0	2,050	6,462	5,566
Del.	12.7	14.0	14.0	465	644	602
Md.	13.6	16.0	16.5	439	656	908
Va.	15.2	19.0	18.0	1,277	2,527	2,772
W. Va.	13.0	13.5	13.5	14	14	14
N. C.	12.5	17.0	17.0	2,921	5,117	5,066
S. C.	8.4	12.0	11.0	132	528	594
Ga.	7.0	8.5	7.5	83	204	255
Fla.	—	—	18.0	—	—	108
Ky.	15.8	17.5	20.0	1,293	1,890	2,680
Tenn.	14.6	21.0	20.0	877	3,150	3,520
Ala.	12.6	18.0	18.0	468	1,620	2,052
Miss.	13.5	24.0	18.0	1,362	6,768	6,246
Ark.	15.3	21.0	19.0	3,506	11,676	11,020
La.	13.0	18.0	18.0	378	720	810
Okla.	8.0	17.0	15.0	60	357	675
U. S.	19.0	21.6	20.6	178,567	287,010	270,064

† Short-time average.
*USDA crop reporting board.

Louisiana

W. M. Scott, Scott Plantations, Tallulah (Aug. 25): Maturity 10 days later than normal. Excessively hot and dry. Temperature for last 30 days above 95 degrees. No rain for last 6 weeks. Per acre yield in prospect 75 to 80 percent of 1950. Total yield 70 to 75 percent of 1950. Fields very grassy and full of weeds. Some blister beetle damage. Probably storage for 50 percent of crop, 20 percent more than last year.

Minnesota

Clive F. Marshall, Honeymead Products Co., Mankato, for southern (Aug. 25): Maturity 10 days later than last year. Lot of scenery but poor filling. Moisture highest in history for this time of year. Oats sprouting in the fields. Need full

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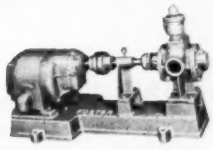

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month without frost. Per acre yield if it comes through will equal or slightly better last year. I have always felt the U. S. is a little low on its acreage figures. Crop quite weedy but big weeds do not cut yields. Grass not bad. Cold weather could have serious effect on oil content. Capital beans look best in this area. In my opinion farmers can store 65 percent of crop. Terminals full. Country elevators signing up a lot of farm storage.

John W. Evans, Montevideo, for southwest central (Aug. 25): Maturity behind normal. Weather cool and rainy. Soybeans still growing instead of developing. Lots of pods forming. Increase over 1950 per acre and total yield if crop matures. Fields have tendency to be more weedy than normal but not enough to hurt crop. Elevators plugged with small grain at present. May or may not clear up.

Howard E. Grow, Farmer Seed & Nursery Co., Faribault, for south central (Aug. 27): Maturity week to 10 days later than normal. Extremely wet and cool season. 5½ inches rain in July. About 9 inches in August. Some late beans may not mature even with frost holding off till October. Total yield up 5 percent if beans mature. Weed control very good. Some bacterial blight. Outlook for crop movement satisfactory.

R. E. Hodgson, Waseca, for south central (Aug. 28): Maturity slow by 7 to 10 days. Rain almost every other day. Cool, cloudy. Fine top growth but limited seed setting due to lack of sunshine. Three weeks of sunshine and heat would make maturity of crop possible. Earliest varieties okay. My estimate, per acre yield 10 to 20 percent less than 1950. Weather from here to frost will tell story. Weed control good in most cases.

Mississippi

Weather and Crop Bulletin, U. S. Department of Commerce (Aug. 14): Soybeans fair to good. Rains would benefit all crops.

Missouri

J. Ross Fleetwood, University of Missouri, Columbia (Aug. 23): Maturity varies from early to very late, probably week late on average. Excessive moisture in most of area at present. Per acre yield outlook 18 bushels compared with 23 in 1950. Most fields not seriously weedy but some terrible. 10% more farm and elevator storage than last year.

E. M. Poirot, Golden City, for southwest (Aug. 23): Maturity normal. Weather and moisture conditions excellent. Prospective yield higher than 1950.

O. H. Acom, Wardell, for Pemiscot County and southeast (Aug. 24): Maturity week to 10 days earlier than normal. Some early beans to be combined next week. Some sections needing rain. Prospective yield of early beans good. Late beans about normal. Fields weedy due to long wet spell in June and early July. Some complaint of bean diseases. Some dusting. Storage plenty. Shipping may be slow. Car shortage. Some new storage being built.

Carver Brown, Laddonia, for northeast (Aug. 27): Maturity of crop a few days early. Weather and moisture conditions good. Per acre yield 5 percent higher than 1950. Total yield same. Weed control good.

Nebraska

Donald G. Hanway, assistant agronomist, University of Nebraska, Lincoln (Aug. 27): Maturity of crop normal to 10 days late, depending on date of planting. Weather and moisture very favorable. Some beans planted late in June may not mature if frost date is normal or early. Total prospective yield equal or slightly higher than 1950. Most fields reasonably clean. Bacterial pustule locally heavy.

New Jersey

J. E. Baylor, New Jersey College of Agriculture, New Brunswick, (Aug. 25): Maturity normal to slightly advanced except where moisture extremely deficient. Many areas of central and south Jersey very dry. Some fields badly rolled and hurt. General appearance indicates yields as good or better than 1950 except as above. Total acreage up about 3,000 acres. Many fields very weedy. Sharp increase in acreage planted in rows but still long way to go.

North Carolina

H. V. Latham, Latham Seed & Equipment Co., Belhaven, for eastern Beaufort County (Aug. 24): Maturity of crop 100 percent of normal. Weather and moisture conditions excellent. Per acre yield outlook 125 percent of 1950. Total yield outlook 140% of 1950. Weed control good, especially early crop. Very good crop here. Good growing conditions since planting. Barring storm damage in September, should have bumper crop. Some bugs. Control methods being used. Inadequate storage. Fair transportation facilities.

Crop Reporting Service, Raleigh (Aug. 15): For first time since 1947 production of soybeans for beans expected to decline. Early crop of beans reported best in recent years. Late crop which followed potatoes not as good.

North Dakota

C. J. Heltemes, Fargo (Aug. 27): Maturity of crop slightly behind normal. Moisture supply very satisfactory. Weather too cool. Crop will mature if we do not get a killing frost for 3 weeks. Looks like a good set of beans. Total prospective yield probably lower because of reduction in acreage.

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Ohio

Soybean Johnson, Delphos, for Delphos Grain & Soya Products Co., Delphos, for northwest (Aug. 24): Maturity week to 10 days earlier than average. Most of crop will be safe Oct. 5. General showers have made excellent conditions and probably enough to finish crop. Showers next 10 days will increase yields. Average will be higher than 1950 by few bushels per acre. Some very weedy fields not filling too well. Many bean fields have excess amount of corn. More farm storage will be available due to short wheat and oat crops.

G. G. Mc Ilroy, Irwin, for west central (Aug. 23): Maturity earlier due to drouth conditions. Prospective per acre yield 10 to 20 percent less than 1950. Weed control better than normal. A lot of clean fields. Some root rot evident, maybe more than last year. Only .55 inches rain since July 23. Rains within week would help a lot but can't possibly have normal crop of beans or corn. Drouth condition prevails over major portion of Ohio.

Calvin Heilman, Rt. 1., Kenton, for Hardin, Wyandot and Marion Counties (Aug. 25): Maturity normal. 95 percent of crop will mature. Total prospective yield 85 to 90 percent of 1950. Weed control very successful. Storage ample if transportation is near normal. A number of fields of Monroe turning color now. Will be ready for harvest Sept. 15. Most of them will be kept for seed. Will outyield later varieties because crop was made before much of drouth was felt. Rains now will be too late to help late beans much.

Lewis C. Saboe, associate professor of agronomy, Ohio State University, Columbus (Aug. 27): Maturity of crop about normal. Drought over most of state has materially reduced over all yield. Per acre yield about 1 to 2 bushels less than 1950 if we get a general rain soon, otherwise lower yet. Total yield 1 million bushels less. More corn, smart weed and grass in fields than usual. Percentage of corn weeds more than ever. Dry weather has cut down diseases. Farm and elevator storage much greater than 1950.

Pennsylvania

E. L. Gasteiger, agricultural statistician, Harrisburg, (Aug. 24): Maturity about normal. A little dry in some localities. Prospective average yield 17 bushels, same as last year. Too wet early in season. Beans had good start.

South Dakota

H. G. Miller & Son, Garden City, for Clark County (Aug. 28): Soybeans will mature as normal. Making good growth. Weather and moisture conditions very good. Never looked better. Yield should be about 15 to 18 bushels to the acre, about normal for this vicinity. Some fields look clean and some are plenty weedy. Transportation is bad and storage also limited.

Tennessee

Peter Fredrickson, West Tennessee Soya Mill, Inc., Tiptonville, for west (Aug. 27): Maturity of crop average. In need of moisture. Per acre yield 90 percent of 1950, total yield 85 percent. Not sufficient farm storage.

Virginia

W. C. White, assistant extension agronomist, Blacksburg, (Aug. 25): Maturity of crop about normal. Dry weather may have reduced vegetative growth, therefore may cause slightly earlier maturity. Frost date will determine whether will mature, particularly with the unusually late planted crops in July and even first of August. Prospective crop 10 percent larger than 1950. The 1950 crop

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more free from weeds than this year's crop despite more efforts on weed control. Japanese and Mexican beetles have done damage. Will be more elevator and storage facilities than ever but probably inadequate for large crop.

John M. Taylor, department of agriculture, Harrisburg (Aug. 23): Maturity 1 week late. Excellent growing weather. A few sections had too much rain for proper cultivation of late seeded crop. Moisture adequate. Total prospective yield 15 to 20 percent larger than 1950. Slight damage in Norfolk area by Japanese beetle.

Wisconsin

John P. Dries, Saukville, for southeastern (Aug. 25): Maturity of crop normal. Weather and moisture conditions very good. Total prospective crop yield equal to or better than 1950. Some fields weedy.

Halmer B. Schauer, Harford, for southeast (Aug. 26): Maturity a little late. Very good growth. Good setting of pods. Ample moisture. Weather rather cool. Total prospective yield better than 1950.

Ontario

R. H. Peck, River Canard, for southwestern (Aug. 23): Average maturity of crop about normal. Moisture very good. Weather cool during August. Per acre yield 20 percent above 1950. Total yield 30 percent increase. More weeds than usual but not serious. Some stem canker showing. Transportation facilities will be very tight with good weather permitting rapid harvesting.

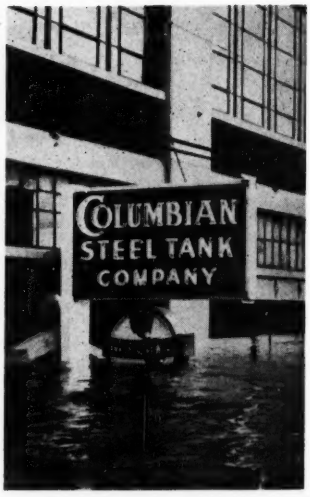
Dominion Bureau of Statistics: Canada's flaxseed acreage for 1951 is almost double last year's while soybean plantings are about one-fourth larger. Official preliminary estimates place the soybean area at 176,100 acres against 142,000 last year.

—s b d—

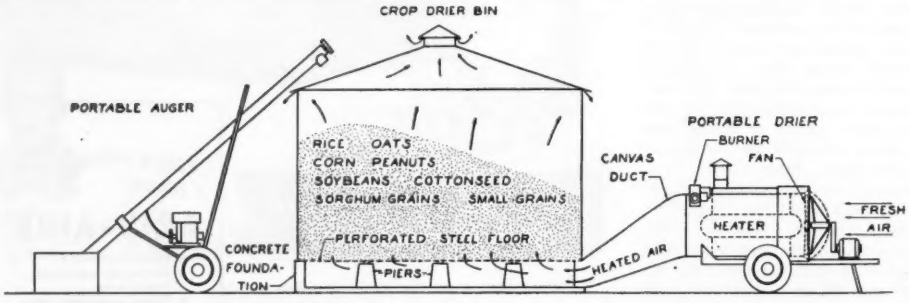
KANSAS CITY FLOOD

The flood that submerged Kansas City's richest industrial area July 13 was a disaster to Columbian Steel Tank Co. as well as the other firms in that part of the city. Within a few hours after the flood wall on the Kaw River broke the production facilities, storage lots and carloading areas of the storage tank manufacturing firm were under 15 feet of water.

But Ralph S. Robinson, Columbian's advertising manager, grabbed his camera and made a pictorial record of the flood and its aftermath.



Robinson made up a 32-page pamphlet, "Black Friday the 13th", which told the story. It was sent to Columbian's 50,000 customers in 13 states. The picture shown above appears in the booklet. Water completely covered all stranded vehicles when the photo was taken.



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GRITS and FLAKES... FROM THE WORLD OF SOY

◆ James P. Casey, associate professor in the pulp and paper department of the college of forestry at Syracuse University, has been appointed director of the technical service branch of the research organization of the A. E. Staley Manufacturing Co., Decatur, Ill.

◆ Chemical plants division of Blaw-Knox Co., Pittsburgh, Pa., has received an additional contract from General Mills, Inc., on the project already being handled for a 250 tons-per-day soybean processing plant at Rossford, Ohio. Included in the new award are a boiler house, lecithin building, service building and auxiliary equipment.

◆ Arthur Berry, manager at the Kankakee, Ill., plant of the chemical division of General Mills, Inc., is to be transferred to Minneapolis headquarters where he will be in charge of the division's fatty acid sales. He has been at Kankakee since 1947.

◆ *"Jumping Beaner" is a story about the diversified enterprises of the Glidden Co. in the Aug. 1 issue of Forbes Magazine.*

◆ John Heyerholm has been appointed field representative of the Northwest Retail Feed Association, and will work out of the organization's office in Minneapolis under the direction of Secretary-Treasurer W. D. Flemming. He is a past president of the Association and former operator of Triple S Feed Mill at Northfield, Minn.

◆ Dr. Max A. Jeter has been appointed a member of the research and nutrition staff of the Indianapolis feed mill division of the Glidden Co. Assisting C. K. Shuman, he will conduct educational and research activities and act as consultant to farmers.

◆ Louisville Soy Products Corp., Louisville, Ky., is doubling the capacity of its solvent processing unit from 100 to 200 tons a day. The firm is adding a new Anderson unit and expects to have it in operation by the time the new crop moves.

◆ *Dr. Paul R. Shildneck, research director of the A. E. Staley Manufacturing Co., Decatur, Ill., since 1947, has been named assistant technical director. He is inventor of the Staley process for making monosodium glutimate. He will continue to supervise research activities.*

◆ E. T. Cashman has been named manager of the Archer-Daniels-Midland Co.'s mixed feed division, with headquarters at Mankato, Minn. He succeeds P. L. Kimble who has retired from active business. Cashman was named assistant manager of the ADM mixed feed division July 1, 1950.

◆ The Federal-North Iowa Grain Co. of Cedar Rapids has announced the purchase of the G. D. Mabie estate elevator at Whitten, Iowa. L. L. Hauser,

HEADS NSPA BOARD

ELDRED A. CAYCE

Eldred A. Cayce, vice president and director of purchasing of Ralston Purina Co., has been elected chairman of the executive committee of the National Soybean Processors Association.

Mr. Cayce has been with the Ralston Purina Co. since 1917. During his years of service with the company he has served on the board of directors of many trade organizations and is past president of the St. Louis Merchants Exchange. He is a member of the board of directors of the National Grain Trade Council, a member of the Chicago Board of Trade, Missouri Bar Association and for a number of years has served as a director and member of the ex-

WILBUR-ELLIS COMPANY

Brokers of Soybean Oil and Proteins
COMPLETE DOMESTIC AND FOREIGN COVERAGE

105 West Adams St., Chicago, Ill.
Telephone: ANDOVER 3-7107

New York **San Francisco** **Buffalo** **Los Angeles** **Seattle**

Inoculates Seeds more thoroughly

Compare the LEGUME-AID package unit for size. You'll find it definitely larger than others and containing more of the bacteria-carrying humus. This increased amount of inoculant makes it easier to treat your seed more thoroughly. The results show up in the form of thriftier, more vigorous plants.

LEGUME-AID

You get both quantity and quality when you use the famous "Inoculant in the Carton." The inner lined package protects bacterial potency and holds enough to generously treat five bushels of soybeans. Order what you need. No waste, no loss, no measuring. And remember — no inoculant does more for soybeans than LEGUME-AID. Tell your dealer you want it.

AGRI-LAB-INC

AGRICULTURAL LABORATORIES, Inc.
1322 Chesapeake Ave. Columbus 16, Ohio

The INOCULANT in the CARTON

At 12 strategic locations throughout the nation Pillsbury feed mills provide an ever-increasing outlet for soybean oil meal.

Pillsbury Mills, Inc.

FEED AND SOY DIVISION
CLINTON, IOWA

Pillsbury's BEST XXXX FEEDS

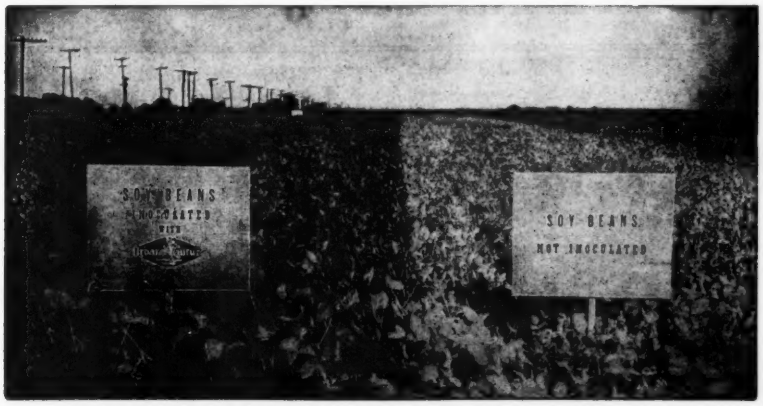
INOCULATION

Urbana Culture Superior Legume Inoculator

for your

Soy Beans

Urbana Culture Superior Legume Inoculator



Inoculate with Urbana Culture and efficiently utilize the free nitrogen of the air.

Prepared only by THE URBANA LABORATORIES Urbana, Illinois

manager of the Whitten elevator for many years, is retiring. The new manager will be Clarence Hammill.

◆ Dr. David Green has been named head of the newly formed animal nutrition department in the research division of Armour & Co. During the past 12 years he has specialized in the application of B vitamins in animal nutrition and in antibiotic feed supplements.

◆ The board of directors of Spencer Chemical Co. has approved the construction of a new chemical plant near Vicksburg, Miss., to produce anhydrous ammonia. There will be facilities to convert about half of the ammonia into agricultural nitrogen. Cost of the plant is expected to be about 14 million dollars.

◆ *George H. Schulz, vice president and treasurer of American Mineral Spirits Co., Chicago, has been elected chairman of the Cook County, Ill., chapter of the National Foundation for Infantile Paralysis.*

◆ Supplement 37-3 to the Eastman Organic Chemicals List No. 37 lists 77 new chemicals and gives molecular weights, structural formulas and melting and boiling ranges. It is available from Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y.

◆ A fundamental research program into the mysteries of trace elements in the soil, which may lead to increased yields and greater nutritional value in farm crops, is underway by Dearborn Motors Corp. and the University of Michigan. Dearborn Motors has made a grant of $100,000 to finance the research for the first four years.

◆ A 20-page illustrated book No. 2377 on Model "UP" vibrating screens for the fast, accurate dry-screening of light and fine materials, and Model "NRM" liquid vibrating screens for the low-cost, high speed separation of solids from liquids, has been published by Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

◆ *H. J. Wehrenbrecht, manager of the Bemis Bro. Bag Co. plant at New Orleans, has been released from the hospital following an appendectomy. He is expected back in his office in the near future.*

◆ A large portion of the balloons bringing messages of hope to satellite nations behind the Iron Curtain by the Crusade for Freedom program were produced by General Mills, Inc., Minneapolis, Minn. These are pillow type balloons and were turned out by the thousands.

◆ James J. Lawler, manager of the Shell Chemical Corp.'s St. Louis district, has been elected chairman of the executive committee of the Soybean Processors Association before being elected to its chairmanship.

Cayce succeeds R. G. Golseth, vice president of the Glidden Co., as chairman of the processor executive committee.

—sbd—

GLIDDEN CHANGES

CLIFTON KOLB ROBERT HORNER

Retirement of Clifton M. Kolb, senior vice president and secretary of the Glidden Co., Cleveland, Ohio, was announced by Adrian D. Joyce, chairman of the board.

Kolb will remain a member of the board of directors.

Kolb started with Glidden in 1922 as head of the company's legal department. He became secretary of the corporation in 1929 and a director in 1938. In 1949 he was elected senior vice president and a member of the executive committee.

Robert D. Horner, formerly an assistant to Kolb, has been elected secretary. The new secretary of the company is 34. He joined the Glidden Co. in 1948.

John A. Peters, treasurer of the Glidden Co., has been elected a vice president and will continue to serve as treasurer. Peters began his career with Glidden in 1920.

IOWA MILLING COMPANY

SOYBEAN PROCESSORS

CEDAR RAPIDS, IOWA

NEW MILL

for grinding oil cakes and residues

When the leading edges of the hammers in this mill get dull, the direction of rotor operation can be reversed to bring the other edges forward. This hammer life saves money, and reduces shut-down time. Alloy tool steel, borod tipped, and tungsten carbide inlaid hammers are available.

That's only one of the improvements in the new Bauer No. 406 Hammer Mill. It is heavier and sturdier. It runs at relatively low speed to granulate with minimum fines and dust. It has an unusually large screen area. It recirculates air through return ducts in the side of the mill, thus more completely controlling dust discharge. This is a special advantage in installations which do not employ pneumatic collecting systems.

A Bauer Magnetic Separator is built in the feed spout. It effectively removes tramp iron and steel. Ferrous objects are trapped before they damage machinery, contaminate the product, or cause sparks.

If you require additional grinding capacity or if your present equipment needs replacement, get all the facts about the Bauer No. 406 Hammer Mill.

Write, wire, or phone for complete information.

THE BAUER BROS. CO.

1723 Sheridan Ave.
Springfield, Ohio

REPRESENTATIVES Martin Neumunz & Co., Inc., 90 West St., New York 6, N. Y. • Franklin F. Landis, Dallas, Ga. • Industrial Supplies, Memphis, Tenn. • R. R. Dill, 468 Prairie Ave., Elmhurst, Ill. • Halsell Brokerage Co., Denver, Colo. • C. C. Cantrell, 2541 Greene Ave., Fort Worth, Tex. • Kenneth Wylie, Eugene, Ore. • A. E. Thompson Co., Minneapolis, Minn.

trict office has been appointed manager of the Chicago district office. He has been with Shell for more than 14 years. James K. Robbins, Jr., is new manager of the St. Louis district office.

◆ Richard F. Warren has been named a senior market research analyst of the market research section of American Cyanamid's new product development department effective Aug. 1. He has been market editor of Chemical Engineering Magazine.

◆ The fourth annual symposium on "Commodity Markets and the Public Interest" sponsored by the Chicago Board of Trade was held in Chicago Sept. 6 and 7. Speakers included Leslie N. Perrin, president of General Mills, Inc.; Ralph G. Golseth, vice president, the Glidden Co.; and J. A. Prindeville, vice president of the Chicago Board of Trade Clearing Corp. Sixty nationally known educators attended.

◆ *Rietz Manufacturing Co., San Francisco, Calif., announces removal of the company's main office and plant to 150 Todd Road, Santa Rosa, Calif. Carl A. Rietz, president of the firm, said his firm will continue to manufacture equipment for the food and chemical processing industries.*

◆ A new 14-page two-color booklet has been published by A. E. Staley Manufacturing Co., Decatur, Ill., explaining its "Hi Pro-Con" product, which is guaranteed to have a minimum 50-percent protein content. It is composed of dehulled solvent extracted soybean oil meal.

◆ A new method of making the hormone drug synthetically from four abundant substances including soybeans has been worked out by Merck & Co. scientists, the firm announces.

◆ *William C. Johnson, executive vice president of Allis-Chalmers Manufacturing Co., died suddenly July 26. He was a member of the executive committee of the board of directors.*

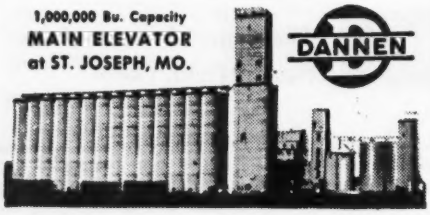
JOINS FULTON BAG CO.

LOUIS J. EVEN

Fulton Bag & Cotton Mills announces the addition of Louis J. Even to its sales staff in New Orleans. Mr. Even is a native of New Orleans and has been connected with the bag industry for many years.

Even has served with several different companies and for the last 13 years was with Bannon Bag Co., until its recent withdrawal from the industry. He has traveled extensively through the South and Mid-West and has a wide acquaintance in the trade.

Ship Your
SOYBEANS
TO
DANNEN MILLS, INC.
St. Joseph, Missouri
MANUFACTURERS OF
Dannen 41% Soybean Oil Meal
Dannen 44% Soybean Oil Meal
Phone 3-0281, St. Joseph, Mo.
1,000,000 Bu. Capacity
MAIN ELEVATOR
at ST. JOSEPH, MO.
DANNEN



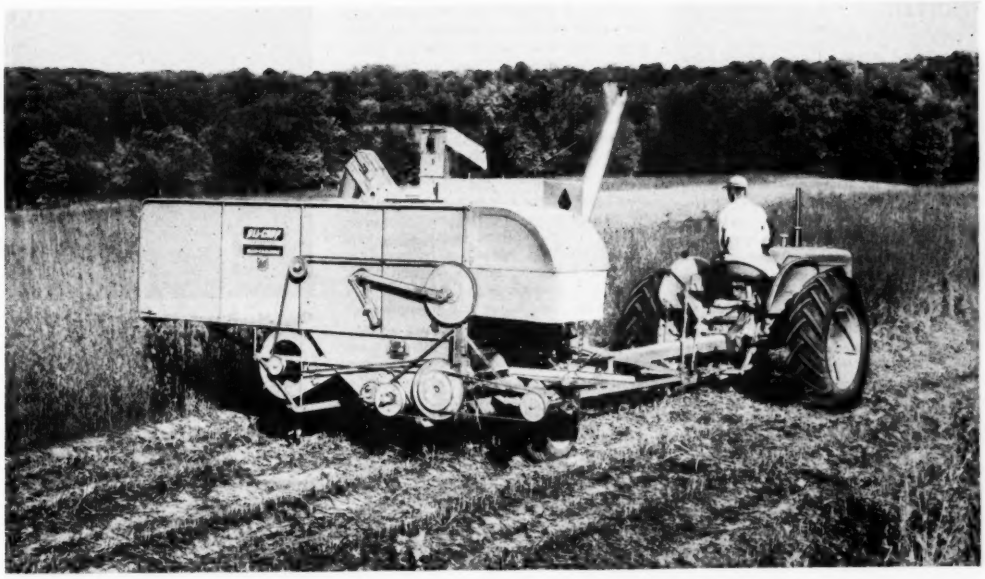
44%
Del-mi-co
SOYBEAN OIL MEAL

Recent tests prove Soybean Oil Meal cooked at 15 lbs. steam pressure is superior in feeding values to dry toasted meals.

All our meal after cooking passes through toaster to conditioner. Frequent by-passes avoid regrinding, thus preventing floury meal, and gives it a very uniform texture.

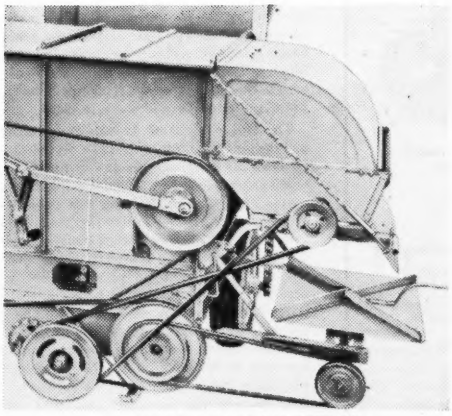
Terminal facilities for all Grains including Soybeans, Corn, Wheat and Oats

Delphos
GRAIN & SOYA PRODUCTS CO.
Delphos, Ohio



Bin More Beans

with your own ALL-CROP Harvester



CHOP SOYBEAN STRAW

Coarse beanstalks and stems are chopped for soil-building mulch by this rotary scissor-action straw chopper attachment. Straw spreader scatters straw evenly over ground. Both are optional attachments.

ALL-CROP is an Allis-Chalmers trade-mark.

Look at the stubble . . . even height . . . close to the ground. No beans are left there. The ALL-CROP Harvester's clean-shearing sickle action and bean-catching, rubberized drapers reduce shattering loss to a minimum. More beans go into the bin . . . more money into your pocket.

Uniform harvesting is easy, even on rough land. The crop-saving guards can be set low, at the right slant to comb the ground for low-hanging pods.

Wide, rubber-faced cylinder bars cushion soybeans against crackage. Quick cylinder speed changer selects the right threshing action at the turn of a crank. Sawtooth wind control valves spread the air blast just as you want it for removing stems, chaff and foreign materials.

The ALL-CROP Harvester is easy to run . . . easy to keep running. Its light weight makes it easy to pull . . . ready to go when the crop is ripe. Ask your Allis-Chalmers dealer about the money-saving ALL-CROP Harvester.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

STRAYER

(Continued from page 21)

the early crop moved. Farmers realized the situation, took advantage of it. For years we had been talking about an intelligent marketing pattern for the soybean industry, had pointed out repeatedly in meetings, editorials, news releases and other mediums the necessity of spreading the marketing season over a period of months. It came about! We preached the doctrine so frequently that people believed us—and their faith was rewarded during this past year.

In 1951 we have a reduced soybean acreage. Crop reports emanating from the states to the east of us indicate extremely high yields, and the federal crop forecasts tell of a total production of about 270 million bushels, as compared with 290 million bushels last year. Had the weather man cooperated in most areas the shrinkage in acreage would have been greater, for many intended small grain and corn acres went into soybeans before the season was over.

This year—1951—the price story looks like a different one. Instead of a 9-million-bale cotton crop, there will be a production of about 17 million bales. That means almost twice as much cottonseed oil and cottonseed meal. It means more competition for the markets in both products. In addition, there will be an extremely heavy hog marketing this fall, and in some areas, Iowa included, there may be long-term feeding of spring pigs in order to utilize soft corn. That means heavier than normal supplies of lard.

To add to the confusion, it appears that our export markets on soybeans may have gotten away from us in the past two years. Due to the quality of beans we have been supplying, coupled with dollar exchange problems, European buyers are turning elsewhere for their supplies. The market has been a steadily shrinking one—you heard that story yesterday afternoon.

On first thought it may appear that this export market is a very minor one. During the past year we have had relatively high soybean prices, a short cotton crop, and needed our meal and oil at home. This next year it is going to be a different story. While our domestic processors would like to handle the entire 270-million-bushel crop in our own mills, there may or may not be a market for the quantity of meal and oil which would be produced. If there is not, then the export market may well be the balancing factor which enables us to market this crop intelligently and at prices at or above support levels.

In the 1949 crop year one-third of our total production of soybean oil went into export channels, either as beans or as oil. The world demand for fats and oils and for proteins has not been satisfied. The supply of free dollars in European countries having deficits of fats is more adequate than a year ago. They have processing facilities. They do not want to buy cottonseed. They do not want to buy cottonseed oil, or lard. Neither do they want to buy soybean oil. They want to buy soybeans. If domestic processors find themselves in a price

Geo. M. Strayer gives annual secretary-treasurer's report. At left is John W. Evans, retiring president.

squeeze where they can not pay at or above support price levels for 1951 crop soybeans, then we might see a very distinct increase in export movement—perhaps from CCC stocks as acquired under the loan program in connection with support prices. Commodity Credit Corp. has never yet lost a penny on the soybean crop. Let's see that they do not lose this year!

This matter of exports has already received much attention on this program, and I need say nothing further—except to emphasize that over a period of years we should do everything we can to cultivate and protect that outlet. Some years it will not be important. Other years it may be all-important.

One year ago I reported on the legislative activities of the organization, and on our participation in the repeal of federal margarine legislation. Since that time we have seen the margarine market for soybean oil increase in importance, from month to month, as the consumption of margarine by the households of America increased.

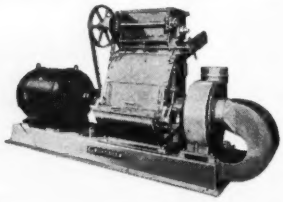
Strangely, one of the states which had retained its ban on the sale of yellow margarine was our host state of last year—the nation's leading soybean producer, Illinois. Much yellow margarine was being produced within the borders of the state of Illinois, but it could not be sold there at retail.

The Illinois General Assembly met during the first half of 1951. The American Soybean Association, together with many other groups, took a very active part in the writing, introduction, guiding and passage of legislation which permits the manufacture and sale of yellow margarine in the state of Illinois. The law became effective on July 1, and while I have not seen a report on yellow margarine sales in that state, I am sure they must now be rather sizeable. One more state—a heavily populated one and an important margarine market—has been added to the list of those who allow their citizens to take their own free choice of food products. Change in the Pennsylvania law during this past month leaves only eight states now barring yellow margarine.

Very significant in the Illinois legislation is the fact that one of the three bills passed by the legislature and becoming law on July 1 provides that margarine may be *produced* and *sold* in the state only when it is

GRUENDLER CRUSHER & PULVERIZERS — SINCE 1885

The Case of the "Whispering Mill"



Latest GRUENDLER "48" Model Whirl-beater Feed Mill

NO MYSTERY TO GRUENDLER OWNERS . . .

Here is what one miller in Tennessee has written us, regarding his Gruendler Feed Mill . . .

** The Gruendler No. 2 Feed Mill after operating almost 25 years is still a beautiful performing machine, compared to the usual hammer-mill It's "Voice" is still a Whisper.*

WRITE: Let us mail you bulletins on Gruendler Mills, Hay Grinders, Mixers, Weigh-Batchers, Molasses Mixers.

GRUENDLER CRUSHER AND PULVERIZER CO. ST. LOUIS 6, MO.

made entirely from domestically produced fats and oils. It was only at the insistence of the American Soybean Association, and especially your president, John Evans, that this provision was included in the legislation. We were repeatedly told it could not be done. It *was* done. Any protection of the American market for American farmers which was provided by this legislation can be credited only to your organization and to no other. Ours was the only agricultural group working for the legislation, and it became law over the opposition of the dominant farm organization in the state. Now there are other states to be conquered on margarine legislation. It is my hope, as a resident of Iowa, that within one year of the date of this meeting we may be buying yellow margarine in the state of Iowa. Stranger things have happened!

At your convention one year ago a resolution was passed asking for revision of the soybean grading standards, and calling for a reduction of 1 percent in allowable foreign material and moisture in all grades. That resolution was immediately forwarded to the grain grading section, grain branch, Production and Marketing Administration, U. S. Department of Agriculture. The National Soybean Processors Association endorsed our request, and hearings were announced for late January and early February. Those hearings were held, and your Association had at least one man present at every hearing to point out the injustice of the present standards and the penalty which is being assessed against the careful grower.

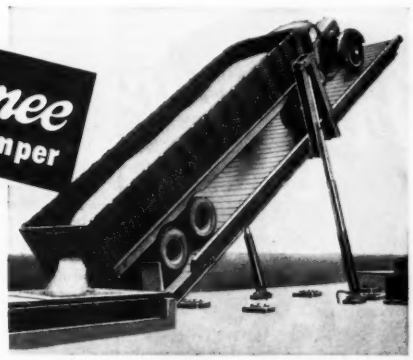
We were unsuccessful. No changes were made. We have reason to believe that political, rather than practical reasoning governed the decision. The need still exists. The change in standards in 1949 was a step in the wrong direction. I hope this meeting will adopt a resolution again this year calling for additional hearings and changes. We must not rest until soybean grades truly represent soybean values.

Your Association during the past year participated in the hearings held by the Interstate Commerce Commission on the proposed increase in freight rates on export soybeans out of the Delta area. The organized opposition of which we were a part was successful in postponing the date of the increase so that the major portion of the 1950 crop moved at the old rate, and at the same time held the increase to a lower figure than that originally proposed by the railroads. In dollars it is hard to measure the results of actions such as this —for the dollars go back to the grower and the shipper, not to the Association. It was one of those jobs which must be done by organized effort. Your Association was happy to be a participant in this effort to obtain maximum returns to soybean growers in that area where prices have traditionally been low.

My analysis of the problems which will confront your organization during the coming year indicates that foremost among them will be the matter of markets for meal and oil. For several years we have been talking about an educational and promotional program for the industry. Last fall we appointed a member of the board of directors to serve as a member of the trade development committee which had been established by the National Soybean Processors Association to work on this matter. We have prepared suggested advertisements on soybean oil meal, and many of the processors and feed dealers have used mats from this series. We have worked with buyers for large organizations on their ingredients in shortenings and margarines, attempting to convince them that soybean oil is a good product, worthy of their expanded usage. We are preparing right now the copy and lay-out for a 40 page booklet on the feeding of soybean oil meal to livestock. We hope to have this ready within a very short time, and it is our further hope that it will be purchased in rather large quantities by the trade. We expect to make it available at actual production costs, as a service to feeders and growers.

From the standpoint of finances, the Association has had what might be called a satisfactory year. We watched expenditures closely, took in about $3400 more than we spent. Advertising in the Soybean Digest and Soybean Blue Book continued to hold at good levels in spite of business uncertainty, enabling those two publications to pay their own way. The payment of $3 membership-subscriptions during the year was not as satisfactory as in some previous years, for the percentage of renewals

Kewanee Hydraulic Dumper



- Unloads all sizes of Trucks and big Tractor Trailers.
- Sizes—40′, 45′ and 50′ Platforms. Other sizes special.
- Capacities to 100,000 lbs.
- Scale and Non-Scale Types.
- TWIN Hydraulic Power Units.
- Pit and Pitless Models. Pitless reduces foundation costs.

UNLOADS all sizes of Trucks and big Tractor Trailers in a "jiffy." Takes all the time-stealing hard work out of unloading...eliminates waiting time and keeps trucks "on the go."

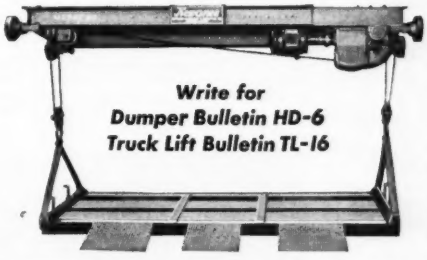
Evidence of KEWANEE performance and economy is overwhelming. It is substantiated by successive repeat orders from outstanding firms who have installed them in all their plants.

One elevator reports unloading over 1,000,000 bu. of grain in one month's operation with a two man crew, averaging over 100 trucks each working day.

This New KEWANEE Pitless Model cuts foundation costs to a minimum.

Every Trucker and Grower is a real booster. They appreciate "no long waiting in line" in busy harvest seasons and they tell others. It attracts new customers, widens your territory and expands your volume.

WRITE FOR BULLETIN — find out how KEWANEE will cut your unloading costs.



Kewanee Truck Lifts

- Adjustable for Driveways 11′ to 15′6″ widths.
- Low Head Room.
- Large, deep flanged Winding Drums. Uniform winding.
- Cut Worm Gear Reducer.
- Crucible steel Lifting Cables, extra flexible.

ENGINEERED for easy operation and dependable performance, backed by 31 years' know-how in the grain trade.

Extra strength channel steel frame provides rigid support for operating mechanism. All working parts are below the frame, permitting maximum lift.

Telescoping frame adjustable every 2″ for driveways 11′0″ to 15′6″. New heavy duty Cradle of greater strength and utility. Strong lifting cables.

Whatever your unloading problem, there's a KEWANEE adaptable to it. We manufacture many different models to meet any condition.

KEWANEE Engineers can suggest a type best suited to your problem. Write for Free Bulletin and full information.

KEWANEE MACHINERY & CONVEYOR CO., Kewanee, Illinois

slipped downward, necessitating increasing emphasis on new members.

Due to the participation of a group of soybean processors in our financing program this year the field program brought in about $3,200 more than was expended in the operations of that division, enabling the Association to expend some of those funds on legislative work, especially in Illinois, and in general organization activities.

However, at this time I would like to again point out that altogether too much time of the members of the staff of the Association is being expended in arranging for financing and not enough is being expended on the multitude of educational and promotional jobs which need doing. We need to expand and broaden the base of financing for our Association. We must have participation by a much higher percentage of the growers, working through their local grain buyers, before we can ever be truly effective. We need the cooperation of an increasingly large number of processors of the soybean crop, so that our efforts toward promotion and education can be carried on in greater and greater proportions. Sometimes I feel that the soybean industry has been too fortunate. How many times has the grower ever lacked for a market for his crop? How many times has there been a depressing carry-over at the end of the year? How many years has the processor lost money? How many years has the local bean buyer failed to make a profit? How many times has the real need for education and promotion made itself felt all up and down the industry?

Have we been so fortunate that we have failed to see the need which cannot help present itself over a period of time? Have we been so blessed with new products, new markets, new outlets in recent years that we have failed to recognize the need for consumer education? Most industry organizations were established in times of adversity. A year ago you heard the story of the National Livestock and Meat Board, how it was formulated when the livestock industry faced ruinous attacks and even more ruinous prices. You heard the story of the educational program of the National Cottonseed Products Association from Mr. Ward a year ago. You also heard the story of the National Cotton Council and how it came into being when cotton had its back to the wall, with shrinking markets, give-away prices and subsistence production. Perhaps the soybean industry will find it necessary to go through a similar period before a soundly financed educational and promotional program can become a reality.

I hope—and I believe—that the soybean industry is far-sighted enough to provide now for the time when adversity strikes. I hope we are wise enough to be prepared for that time. Certainly the day can be forestalled if we are ready. However, our results from the finance program so far have not been too encouraging. We need more emphasis on this phase, more work on it, more farmers realizing the benefits to be derived, more local buyers making the deductions and remitting to us.

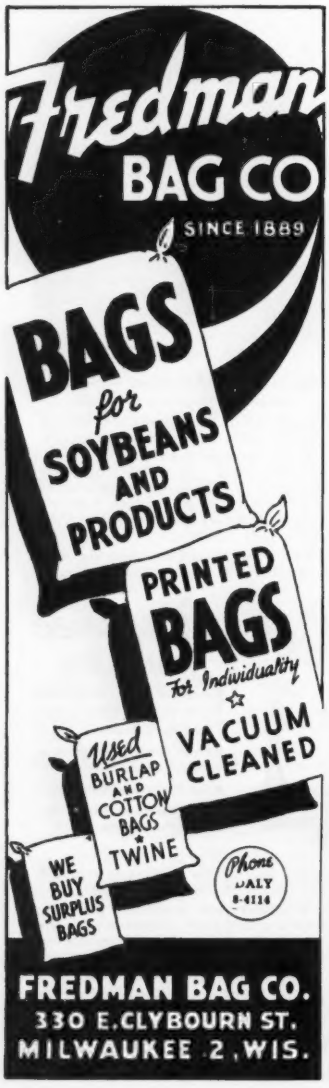
At the present time soybeans are in a rather favorable position, price-wise. By a happy circumstance over which no one present here today had control, ceiling prices on soybeans are at levels higher than we had a right to expect. The base period May 24-June 24, 1950, happened to be the high point of that marketing year. The new parity formula established a *support price* on soybeans more nearly in line with the true worth of the crop, for it shed the injustice of the parity formula previously used, and for which there was no historic basis. Established at $2.45 per bushel, 90 percent of parity, the support price is well above last year's levels. Compared to other commodities, soybean prices this fall will be reasonably good. But, over a period of time, will they stay that way? That depends on our willingness to make them stay that way, and on our industry actions.

The major function of the American Soybean Association should be that of doing everything in its power to place and maintain soybeans in a favorable price relationship with other crops. By so doing soybean acreage will be maintained and increased as needed, processing plants will continue to operate, local bean buyers and elevators will handle large quantities of the crop on a profitable basis, and the true values of the meal and the oil contained in the crop will be made available to the people of the world.

That objective involves education, legislation, research, and promotion, all adequately financed and intelligently directed. Your association should budget its time, its financing and its efforts accordingly.—Geo. M. Strayer, Secretary-Treasurer.

Annual Report of the Field Service Division

It is a pleasure again to report the activities of the field service division during the past year. Last year was a successful year, but I believe that it brought into fo-



Convention women take part in broadcast, "Iowa Feature Fare," over Radio Station WHO. L to r, Mrs. John W. Evans; Betty Brady, star of the Show; Bill Austin at the piano; Mrs. Chester B. Biddle; and Mrs. Geo. M. Strayer.

—Photo courtesy Radio Station WHO

cus our weaknesses as well as our strong points.

For those of you who have not been following the activities of your Association too closely, maybe a quick review of just what the field service is and what its duties are is in order.

Your Association meeting at Columbus, Ohio, in 1947 decided that it was high time that the soybean industry have a well financed promotional program similar to the programs that were under way in the National Cotton Council, the National Livestock and Meat Board and the American Dairy Association.

It was also decided that your Association would collect one-fifth of a cent per bushel or 20 cents per hundred bushels from the producer at the time that he sold his soybeans to the elevator. This is similar to the way the Cotton Council collects its 10-cents-per-bale at the gin or the American Dairy Association collects its 1-cent-per-pound of butterfat during certain months. It was hoped that these collections would then make it possible for your Association to do the type of work that was needed in the soybean industry.

The field service division was set up to put that program of collection into being as well as to carry out some of the "grass roots activities" of your Association.

About two years ago several of the processors who felt that the Association's aims and program were very much in accord with their own ideas began to support the Association by putting in 50 cents per thousand bushels on the soybeans that they crushed. It is now the duty of the field service division to contact these processors as well as others who want to support your Association.

Before giving the financial report of the field service division, I would first like to report on the activities that are and have been carried on in this division. Last year on request of some of the processors and others who had an interest in selling straight soybean oil meal, we prepared a series of four ads on soybean oil meal. The response to these ad mats was such that during the past year your Association released two more series of four ads each. One of the series was on feeder cattle and the other on hogs. These were also well received. Because of the limited staff of your Association it has not been possible to put out as many ad series as we would have liked, but I can report that another series is in the works and should be out soon.

Last winter many people became alarmed over what could happen to the food and fiber supply of this country if we should get into an all-out war. The short harvest of 1950 convinced them that this country did not really have a surplus of food and fiber. All of this brought on an uproar to get the farmer to plant more corn, more cotton, more wheat, more grain sorghum, while maintaining close to last year's record soybean acreage. In fact, Secretary of Agriculture Brannan made a trip to this very city to urge such plantings. It is our belief that what was really needed was not so much more acreage but more bushels per acre if these goals were to be reached, and at the same time maintain a good sized soybean crop. To put across this idea, your Association's office organized and conducted a promotional program that we like to call the campaign for "More Bushels Not Ruined Acres in 1951."

Your Association never went so completely all out before to put over an idea. The whole program was to present to the farmer those cultural practices that will increase the per-acre yield of soybeans.

First, we wrote a letter to 4,868 newspapers and radio stations, 1,069 county agents and to 6,560 vocational agricultural and on-the-farm veterans teachers in 23 states pointing out what we were doing and offering to help them if they felt the way that we did. Then a series of six weekly news releases was prepared and sent out on a weekly basis to these 4,868 newspapers and radio stations and to the 1,069 county agents. This was followed up by offering to the county agents and to the 6,560 agriculture teachers bookings of the three films on soybean production that we had in the office. The requests for these films were such that although Allis Chalmers made extra copies of "The Soybean Story" available and Victory Mills did the same with "Beans and Bounty" while the National Soybean Crop Improvement Council supplied extra copies of their film "Soybeans—The Feature Story" and with all processors that had copies helping, it was impossible to fill all the requests for bookings that we had last spring, and we still have bookings from this effort that run until this time next year.

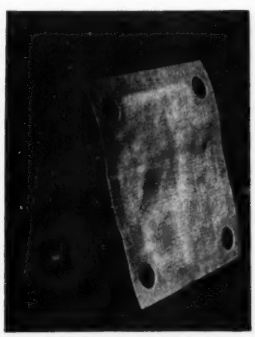
Several of the general farm magazines as well as our own Soybean Digest ran stories on how to increase the per-acre production of soybeans.

Last but not least, your Association printed a leaflet entitled, "Six Right Steps for Peak Soybean Production". I am sure that most of you have seen a copy of that leaflet. The leaflet was offered free to county agents, agricultural teachers, elevators and all members of the Association. At the same time we offered to sell at about cost copies of the leaflet to processors who really wanted to hit their areas. I don't believe that your Association has ever done anything that went over the way that little leaflet did. We mailed out over 155,000 copies before we ran out and since have had to turn down requests for at least 10,000 additional copies and requests are still rolling in every week.

The way that this material on soybean production was grabbed up, I am sure that the idea that farmers know all they want to know about soybean production is a mistaken one and we have just scratched the surface on the good that such campaigns will do.

At the Springfield convention last year, A. L. Ward of the Cottonseed Products Association gave a speech on what his Association was doing for cottonseed meal. One of their "Pride and Joys" is a little 44-page book on feeding that they put out yearly called "Feeding Practices." It goes without saying that this book does not hide the virtues of cottonseed meal. They have been putting out this book for 25 years and Mr. Ward, as well as his members, feel that this book has played a major part in putting over the story of cottonseed meal in feeds. After Mr. Ward's speech several members of the Association suggested to us in the office that maybe the soybean industry needed a similar book where the true story of soybean meal's worth as a feed and in feeds is told. After the convention I made several calls among people who might be interested in using such a book. I returned to the office convinced that such a book was long overdue.

Kent Pellett, managing editor of the Soybean Digest, has since that time been burning the midnight oil to write such a book. He has completed the first draft of the



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Paul Hughes discusses ASA field service program with Hartley L. Kerr, Scotland County Grain Co., Memphis, Mo., at the convention.

book; mimeographed copies of a couple of the sections are floating around the convention. Many of you will receive mimeographed copies of this first draft and your comments and suggestions will be most welcome. It is our hope that the first copies will be off the press by the first of November. We feel that the response to this feed book will surpass that received by "Six Right Steps for Peak Soybean Production".

Your Association always has an interest in improving the quality of American soybeans. As one car maker so well put it, you do not stay in business producing cars that you think the people should have but by producing cars that the people want. No soybean processor can stay long in business unless he produces the quality of meal and oil that the trade demands. Neither can the producer get a good price for soybeans of a quality that the trade does not want. That story was well covered yesterday. Our field service division during August along with the University of Missouri held four grading schools. We hope that these will play a small part in improving the quality of our soybeans.

As for the money collected during the past year, again the collections show an increase over last year. This year your Association collected through elevators $6,207.74, and from processors $2,979.56 for a total of $9,181.30 which is about $2,000 better than last year. This gave your Association a little better than $3,000 to do something with other than keeping the field service division alive.

I believe we have had a fairly successful year and we do not need to apologize for the showing made by the field service division. But we are not doing one-tenth of what the field service should be doing for the benefit of the soybean industry.

Why are we failing to do the job as we should? The obvious answer after looking at the financial report is that we do not have enough money. But why don't we have enough money? I suppose that is somewhat like the question of which came first the hen or the egg. Right now because we are short of money we have a small staff and it is impossible to contact all the producers, elevators and processors necessary so that we can have enough money to hire a large enough staff not only to get enough money but also to carry out the programs of your Association. Until that time we can't help but limp along.

Without bragging or complaining I have found that when I am in the office working on something like the campaign for "More Bushels Not Ruined Acres" that the contact work in the field is not doing itself. Yet when I am out making the contacts worthwhile projects must set in the office undone. Mr. Strayer or Mr. Pellett or Mr. McCulley can't do them because they are busy with their own work.

I have one recommendation I would like to make to you as members of the American Soybean Association and that is until the Association is able to have a staff large enough not only to make the field contacts needed to collect the necessary money but to carry out a full and active program that will mean ever increasing profits to you that you get the missionary spirit and sell the people in your own local area on the Association. You can do it if you will talk to your elevator manager, to your neighbor, to your local farm group. All it takes is the membership talking American Soybean Association and believing in the American Soybean Association.—PAUL C. HUGHES, FIELD SERVICE DIRECTOR.

Resolutions

A VOTE OF THANKS:

The Association expresses its appreciation to all those individuals, organizations and institutions which contributed to making this 1951 meeting in Des Moines an outstanding success.

SOYBEAN GRADING STANDARDS:

We urge that the effort be continued to revise grading standards to the end that the grower be paid upon a basis that reflects the quality of the crop he produces.

RESEARCH:

Knowing that basic soybean research has produced new wealth all out of proportion to its cost, we deplore the current curtailment of such research work and insist that appropriations for soybean research be increased commensurate with the expanding importance of the crop; federal appropria-

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Chestnut 1122 TWX 238
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St. Louis 2, Mo.

tions particularly being earmarked to insure that voted funds are used for basic research.

SHORTENING EXTENDERS:

We reaffirm our stand taken in years past that no product shall be incorporated into an American food that has not been conclusively proven to be nutritious and in the interest of the consumers' health.

RESTRICTIONS ON MARGARINE:

We pledge our continued effort in behalf of the removal of all restrictions on margarine made from domestic fats and oils in the few states where such restrictions still remain, that is in the states of Iowa, Minnesota, Montana, New York, South Dakota, Vermont, Washington and Wisconsin.

PROCESSING TAXES:

We favor the retention of processing taxes on imported oil bearing materials and instruct our officers to make an all out effort to defeat any and all proposals to remove such processing taxes.

SOY PRODUCTS IN FOODS:

We pledge our continued support and appreciation of the fine work being done to prove and promote the value of soy flour and other soya food products in both the domestic and foreign markets.

FIELD SERVICE PROGRAM:

We urge the continuation and expansion of the field service program believing it fills a need of soybean growers as well as of the whole soybean industry.

—s b d—

ADM BUYS SMALL CO.

Purchase of The W. J. Small Co., Inc., by Archer-Daniels-Midland is announced by T. L. Daniels, president of the Minneapolis firm.

Recognized as the world's largest producer of high quality dehydrated alfalfa meal, the company will operate as The W. J. Small Co. division of Archer-Daniels-Midland Co.

As a result of this purchase, ADM becomes the leading supplier of another important ingredient for the livestock and poultry feed industry. Although the value of dehydrated alfalfa meal was not recognized until recent years, it is now found in nearly every commercial ration for hogs, chickens and turkeys, and in many beef and dairy rations.

All milling and warehousing assets of The W. J. Small Co. are being taken over, Daniels said. These include dehydrating and blending plants, warehouses, cold storage plants, and the shops where the company designs and manufactures its own field choppers, self feeders, dehydrators, hammer mills and other plant equipment.

W. J. Small, founder and president of the company, is recognized as the pioneer in the dehydrated alfalfa meal industry. The firm operates 51 plants located in Kansas, Nebraska, Missouri, Colorado, Illinois, Arizona, Oklahoma and Tennessee.

—s b d—

NEW USE FOR SOY FLOUR

A new process of sugar liquor purification which may greatly reduce the cost of sugar refining has been developed by Lie Tien Chang of the Savannah Sugar Refinery, Savannah, Ga., according to Food Field Reporter.

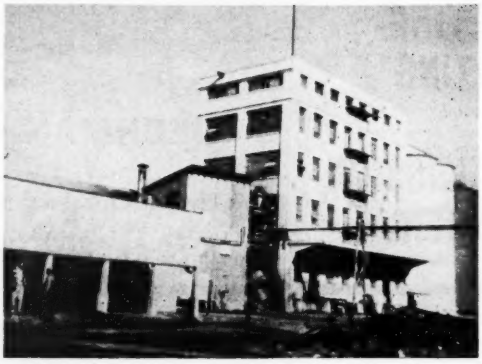
By Chang's process the raw sugar is first dissolved in water. Soybean flour is mixed with the liquor to form a soft precipitate after heating, which removes the impurities. The precipitate is then separated by controlled heating, leaving a soybean cake and clear sugar liquor for further processing.

The purification is attributed to the coagulation of soybean protein. Although the process has thus far been applied only to sugar refining, Chang points out it may also be used for the purification of other liquors which contain the required mineral matter for the coagulation.

Chief economic advantage of the new process, the scientist holds, is that the used soybean flour, high in protein and ash, is recovered and may later be utilized as cattle feed or fertilizer.

Another cited advantage is the ability of soybean flour to remove an appreciable amount of coloring matter from the sugar liquor, which is required before white sugar is made.

Solvent Plant at Wilson, Ark.



—Photo by Soybean Digest

This is the 100-ton-capacity solvent plant of Wilson Soya Corp., Wilson, Ark. Firm has storage capacity for 1 million bushels of soybeans. President is R. E. L. Wilson 3rd. Manager is R. A. Pratt.

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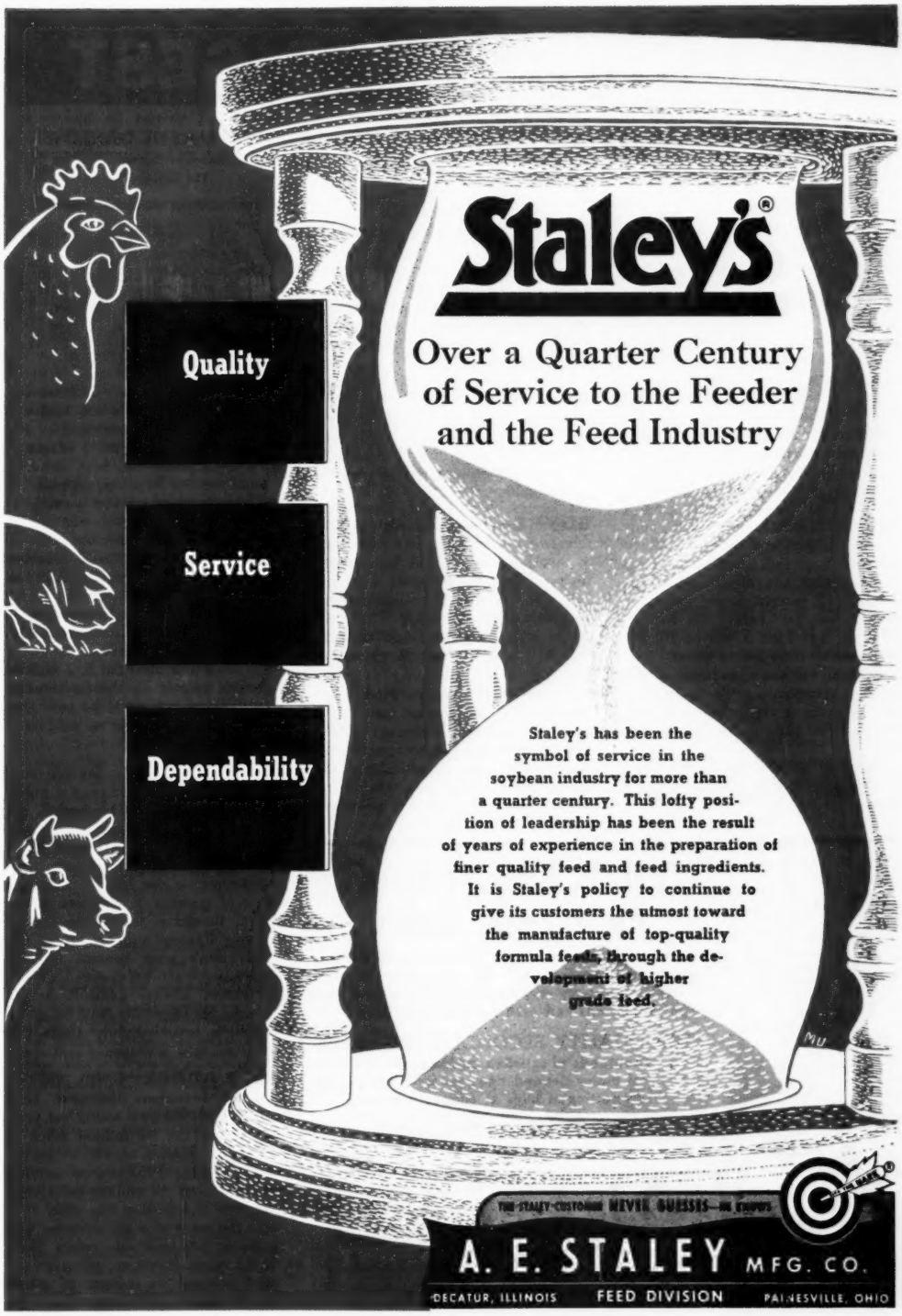
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WASHINGTON DIGEST

By WAYNE DARROW
Washington Correspondent for
The Soybean Digest

INFLATION. There's going to be some more inflation. It's showing a little now. Nearly every commodity market is edging up.

The questions are: How fast will the new inflation develop? How far will it go?

The consensus here is that inflation will be of the creeping variety, that it will be plainly noticeable by the end of the year, and that it will lift the general price level by 3 to 5 percent. This compares with an average increase in wholesale prices of about 12 percent in the 14 months following the Korean war.

The coming inflation is different from that of last winter. That was a panic inflation. It wasn't based on shortages, but on fear of shortages. The new inflation is coming from a reduction in supply of civilian goods due to larger and larger military demand.

Production for civilian use was actually 17 percent larger last June than it was just before the Korean war. By next June it will be 10 percent smaller than before Korea.

Larger civilian production and swollen inventories explain the price lull after the scare inflation of last winter. The turning point came in July.

Two things are happening now: Over-stocked inventories are going down—no one knows just how fast. Production for civilian use is declining.

The changing supply and demand situation will be felt first and most in the durable goods field. That's where the military is biting most into supplies. The indirect effects will be felt in all lines, including agriculture. The price lift will be pronounced for commodities that are a bit short in supply. It will be noticeable where supply and demand aren't far out of line—as in soybeans.

These are the well nigh unanimous views of a score of top experts here. They're variously expressed, but they all add up to the unmistakable conclusion that regardless of war or peace, an inflationary price trend is in the making.

SOYBEANS. Translated into terms of fats and oils, the consensus is that bean prices will be strongly higher after the seasonal dip this fall. That the trend in oil prices will be steady to a little higher. That meal prices will strengthen by something like $10 a ton above the seasonal low.

Unless all the foreign experts are wrong, the bean export market is going to be unusually strong this fall. PMA officials are "programming" exports, and their unpublished estimates are very high. Some even think bean prices will touch ceilings early next year—crushers and exporters will be competing for beans.

The expectation is for bean prices to touch and probably go a little below support level in October. The $2.45 a bushel national average farm loan is roughly equal to $2.67 bean quotations at Chicago.

COTTONSEED. Cottonseed prices rose about $5 a ton within a week after the government announced the support price program. Until then, prices had been down to around the $65.50 a ton support.

The cottonseed support price program means that 15½-cent oil is probably the price floor for most of the coming year. At least, crushers have the means of keeping oil prices from going under that level.

All they have to do is pay ginners the support price for the base grade. If they can't sell the oil for about 15½ cents and meal for $54 to $56, they can unload on the Commodity Credit Corporation. Mills and gins must certify that they've paid support prices for seed.

FLAXSEED. The flaxseed support price for the 1952 crop is going to be raised close to $1 a bushel. It's to be put at 80 to 85 percent of parity, which is a range of about $3.75 to $4 a bushel, Minneapolis. Announcement is due by Oct. 1, in advance of planting in Southern states.

War danger is the reason for increasing flaxseed support prices. Officials don't want present reserves reduced.

Flaxseed acreage goals to be announced in December will be about 4 million acres—slightly above this year's planted acreage.

1952 ACRES. USDA probably will ask for about the same bean acreage in 1952 as it asked last year. It will ask for 90 million acres of corn, but doesn't expect to get it. USDA thinks 1952 cotton acreage will be about 26 million acres compared to 29.4 million this year.

In the event of a hot shooting war, sensitive fats and oils prices likely would zoom. However, officials don't think demand for soybean oil would be increased significantly unless un-

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foreseen developments occur. In addition, a war might cut off many export markets. Use of soybean oil as a drying oil isn't expected to be great, as in the last war. Flaxseed and linseed oil reserves are fairly ample for a start, and flaxseed production can be stepped up much faster than in World War II.

EXPORTS. Bean exports for the year ending Sept. 30 may exceed 65 million bushels, officials now estimate. Forty-three percent are as beans, 57 percent as crude oil. Europe has taken about two-thirds of all exports, 23 percent as beans and 77 percent as oil. The exact reverse is true as to proportions of beans and oil in shipments outside of Europe.

Total bean and oil exports the current year are 50 percent larger than for the previous year. They're expected to be still larger in the year starting Oct. 1, with a larger proportion going abroad as beans.

Soybean cake and meal exports have been substantial, too. The total through June was 150,000 long tons, with 105,000 tons going to Japan, and 26,000 tons to Europe. Total for the year ending Sept. 30 will be about one-third larger than the total through June.

Taking a long look ahead, foreign officials in USDA doubt U. S. bean export volume will decline greatly, but they do think our exports will diminish in relative importance abroad. In other words, there's an expectation that most of the increase in world imports of vegetable oilseed products will come from outside the U. S.

The two chief developments being watched are Manchurian beans and West African peanuts. Japan is a very large market for beans now, but the U. S. is not the natural supplier. What happens in the future depends on world political developments.

It does not appear now that U. S. bean and oil exports will decline to anywhere near prewar levels in the next 10 years. They're more likely to be in the neighborhood of 30 to 40 million bushels (both beans and oil) than down to the 1937-41 level of about 3½ million bushels.

MARGARINE. Increased use of margarine is estimated to absorb about 45 million more bushels of beans within 10 years than now. That would equal 1949-50 soybean exports. Officials think most of the oil for increased margarine consumption will have to come from beans.

CONTROLS. OPS is discouraged about the new price control law. They call it a ceiling lifter. The so-called Capehart (R., Ind.) Amendment is the chief reason, they say, that will force up many ceilings. Under this amendment, OPS cannot set a ceiling for any processor or manufacturer lower than the price prevailing just before the issuance of the order, or below the highest price the processor received in the period Jan. 24 to June 24, 1950. All cost changes from then to July 26, 1951, have to be allowed.

The provision applies to each individual processor—not to the industry as a whole. OPS says it will have to increase many ceilings to be sure that they're high enough to clear most processors. Otherwise they'd be swamped with applications for individual ceilings.

Congress will do exactly nothing about amending the price and wage control law this fall as requested by President Truman. If prices rise as expected, price controls will be a hot issue in 1952.

Truman is speaking for the record in that expectation. He will charge that Congress gave him neither the tools nor the funds to do a price control job. He's counting on irate consumers to elect him or his successor next year.

—sbd—

OILSEEDS IN DENMARK

Denmark's large and well established oil-processing industry consumed in 1950 almost 197,700 short tons of oilseeds, of which all but 12 percent was imported, according to Foreign Crops and Markets.

Soybeans were the chief item of import into Denmark in 1950, 70 percent of them coming from the United States and the remainder from China and Brazil.

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IN THE MARKETS

Markets Mark Time

There was no great price fluctuation in the markets in August as the old crop year was being closed out. September No. 2 soybeans and spot crude soybean oil broke even for the month. Bulk meal lost $3.50.

There was small activity in the cash soybean market and arrivals at Chicago were not large.

Soybean oil meal slipped a little during the month, but activity was small and the market was almost at a standstill the last of August.

The market for soybean oil showed scant change for the month. Export buying pressured the market a little higher during midmonth. Quotations for crude soybean oil were above cottonseed part of August.

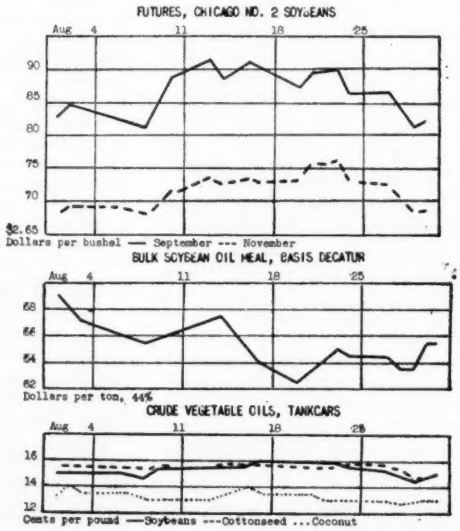
Weakening factors in the soybean market were the large cotton crop prospect—cut to some extent by drouth in Texas—and good soybean crop reports. A consensus of opinions among 39 traders placed the 1951 crop at 281 million bushels, as high as 1950. This is higher than either producers or the U. S. Department of Agriculture are willing to place it.

A strengthening factor was export buying. The Korean talks also had their effect, depending on prospects of a settlement at the moment.

Production of 44% soybean oil meal was heavy, but 41% production was very light and hard to find. Some processors were sold out of old crop meal and slow to offer new crop until 1951 soybeans begin to move.

ECA asked for bids on about 8,000 tons of soybean oil meal Aug. 15 for shipment to Formosa. Holland bought 15,000 tons of soybeans for last-half October shipment. ECA has announced allocation of the following amounts for purchase of soybeans and soy products for shipment to Formosa, and the procurement agencies:

Soybean cake or meal, $1,500,000, General Services



Administration; soybeans, $1,555,000, U. S. Department of Agriculture; soybean oil, $400,000, U. S. Department of Agriculture; soybeans, $900,000, USDA.

September No. 2 soybeans at Chicago opened for the month at $2.83½ and closed at $2.82. Low was $2.81½ Aug. 8. High was $2.91½ Aug. 13.

Bulk soybean oil meal, 44% basis Decatur, opened at $69, the high and closed at $65.50. Low was $62.50. Aug. 20.

Crude soybean oil meal in tankcars opened and closed for the month at 15c. Low was 14½c Sept. 28. High was 16c Sept. 17.

MEMPHIS SOYBEAN OIL MEAL FUTURES AUG. 31*
Bulk—Decatur (Contract 100 tons)

Oct., flat 57.25; Dec., flat 57.25; Jan., 57.00@57.25; Mar., 57.00@57.50; May, flat 57.60; July 57.70@57.90.

CHICAGO SOYBEAN OIL MEAL FUTURES AUG. 31*

Nov., 57.00b-.50a; Dec., 57.10b-.30a; Jan. 57.10b-.40a; Mar., 57.30b-65a; May, 57.75b-.90a; July, 57.70b-58.00.

NEW YORK SOYBEAN OIL FUTURES CLOSINGS AUG. 31*
Old Contract

Jan. 52, 13.75b; March, 13.75b; July, 13.50b; Sept., 13.40b; Oct., 13.30b.

New Contract

Sept., 14.50b; Oct., 14.00b; Nov., 13.85b; Dec., 13.70b; Jan. '52, 13.75b; March, 13.75b; May, 13.80b; July, 13.50b; Sept., 13.40b; Oct., 13.30. No sales.

CHICAGO SOYBEAN OIL FUTURES CLOSINGS AUG. 31*

Sept., 14.65b-.70a; Oct., 14.05b-10a; Nov., 13.85b-.95a; Dec., 13.90; Jan., 13.83b-.90a; Mar., 13.75b-80a; May 13.75; July 13.40b-.60a.
a-Asked. b-Bid. n-Nominal. s-Sales.
*Reported by Chicago edition of Wall Street Journal.

● **SOYBEAN STOCKS.** Production and Marketing Administration's commercial grain stock reports.

(1,000 bu.)

U. S. Soybeans in Store and Afloat at Domestic Markets	July 30	Aug. 6	Aug. 13	Aug. 20	Aug. 27
Atlantic Coast	62	49	47	47	43
Gulf Coast	214	84	32	34	34
Northwestern and Upper Lake	71	39	—	—	—
Lower Lake	1,268	1,508	699	573	482
East Central	427	397	238	211	155
West Central Southwestern & Western	350	274	239	211	176
Total current week	2,391	2,351	1,255	1,076	890
Total year ago	4,979	4,199	3,764	3,424	3,027
U. S. Bonded Soybeans in Store and Afloat at Canadian Markets					
Total current week	11	—	11	11	11
Total year ago	7	7	7	—	—
Total North American Commercial Soybean Stocks					
Current week	2,402	—	1,266	1,087	901
Year ago	4,986	4,206	3,771	3,424	3,027

Soybean stocks of nearly 51.6 million bushels in all storage positions July 1 were largest for the date in the 10 years of record, according to reports assembled by the Bureau of Agricultural Economics. These stocks compared with 46.1 million a year earlier and the previous high July 1 total of 47.8 million in 1944.

The current total includes nearly 33.4 million bushels of soybeans at processing plants, as enumerated by the Bureau of the Census, which is more than were ever in that position on any previous July 1. Commercial stocks at terminals were reported by the Production and Marketing Administration at 4.2 million bushels. The Crop Reporting Board estimated farm stocks at 9.6 million bushels, and holdings in interior mills, elevators and warehouses at 4.4 million bushels—virtually the same as a year ago, but more than usual in that position.

Disappearance of soybeans in the April-June quarter is computed at 90 million bushels. About 61,020,000 bushels were processed in that period, as reported by the Bureau of the Census, and nearly 9 million bushels were exported.

From the Oct. 1, 1950 estimated supply of 290 million bushels, the computed disappearance is about 238 million bushels. On the other hand, since Oct. 1 about 201 million bushels have been processed and 25 million bushels exported. This, with quantities used for seed and feed, results in an apparent discrepancy only slightly

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smaller than indicated by the report as of April 1, 1951.

STOCKS OF SOYBEANS, JULY 1, 1951, WITH COMPARISONS

Position	July 1, 1949	July 1, 1950	April 1, 1951	July 1, 1951
		Thousand bushels		
*On Farms	9,505	7,064	46,114	9,620
§Terminals	3,294	6,190	12,513	4,201
‡Processing Plants	18,333	28,478	62,798	33,367
†Int. Mills, Elev. & Whses.**	9,134	4,359	20,147	4,370
TOTAL	40,266	46,091	141,572	51,558

* Reported by Crop Reporting Board. § Reported by Grain Branch P.M.A. ‡ Reported by Bureau of the Census. † Reported by Crop Reporting Board. ** All off-farm storages not otherwise designated.

OFF-FARM* STOCKS OF SOYBEANS, JULY 1, 1951 WITH COMPARISONS

State	July 1, 1950	April 1, 1951	July 1, 1951	State	July 1, 1950	April 1, 1951	July 1, 1951
	Thousand bushels				Thousand bushels		
Ohio	5,970	10,046	5,683	Kans.	511	1,501	546
Ind.	2,251	8,069	3,728	N. C.	306	944	6
Ill.	16,311	36,849	15,518	Ky.	1	2,319	1,015
Minn.	1,441	4,452	1,716	Ark.	5	2,106	937
Iowa	6,782	15,167	6,609	All Other	3,552	9,046	4,885
Mo.	1,897	4,959	1,295	U. S.	39,027	95,458	41,938

* Includes stocks at processing plants, as enumerated by the Bureau of the Census; commercial stocks at terminals, reported by the Grain Branch, P.M.A.; and stocks in interior mills, elevators and warehouses, estimated by the Crop Reporting Board.

● **FACTORY USE SOYBEAN OIL.** Factory production of crude soybean oil in May totaled 209,264,000 lbs. compared with 212,077,000 lbs. in April, reports Bureau of the Census.

Factory production of refined soybean oil in May totaled 163,260,000 lbs. compared with 180,217,000 lbs. in April.

Factory consumption of crude soybean oil in May totaled 174,958,000 lbs., compared with 192,766,000 lbs. in April. Consumption of refined soybean oil totaled 157,851,000 lbs. in May; 141,076,000 lbs. in April.

Factory and warehouse stocks of crude soybean oil totaled 124,800,000 lbs. May 31; 125,870,000 lbs. Apr. 30. Stocks of refined soybean oil May 31 were 119,641,000 lbs.; Apr. 30, 129,607,000 lbs.

Factory usage of crude soybean oil in May included: soap 120,000 lbs.; paint and varnish 222,000 lbs.; lubricants and greases 29,000 lbs.; other inedible uses, 1,551,000 lbs.

Usage of refined soybean oil in May included: shortening 42,418,000 lbs.; margarine 6,023,000 lbs.; other edible uses 9,747,000 lbs.; soap 23,000 lbs.; paint and varnish 5,204,000 lbs.; lubricants and greases 15,000 lbs.; other inedible products 7,618,000 lbs.

Hydrogenated edible soybean oil entered into the following products in May: shortening 16,069,000 lbs.; margarine 34,678,000 lbs.; inedible uses 4,000 lbs.

Factory production of crude soybean oil June totaled 176,839,000 lbs., of refined soybean oil, 139,124,000 lbs.

Factory consumption of crude soybean oil in June totaled 149,883,000 lbs.; of refined oil, 134,597,000 lbs.

Factory and warehouse stocks of crude soybean oil June 30 totaled 107,383,000 lbs.; of the refined oil 113,715,000 lbs.

Factory usage of crude soybean oil in June included: soap 58,000 lbs.; paint and varnish 259,000 lbs. lubricants and greases 39,000 lbs.; other inedible products 1,664,000 lbs.

Usage of refined soybean oil in June included: shortening 32,275,000 lbs.; margarine 4,784,000 lbs.; other edible products 8,225,000 lbs.; soap 37,000 lbs.;

paint and varnish 4,730,000 lbs.; lubricants and greases 26,000 lbs.; other inedible products 8,237,000 lbs.

Usage of hydrogenated edible soybean oil in June included: shortening 14,424,000 lbs.; margarine 30,989,000 lbs.; other edible products 564,000 lbs.; inedible products 6,000 lbs.

● PROCESSING OPERATIONS. Reported by Bureau of Census, Department of Commerce, for May and June.

PRIMARY PRODUCTS EXCEPT CRUDE OIL, AT CRUDE OIL MILL LOCATIONS: PRODUCTION, SHIPMENTS AND TRANSFERS AND STOCKS, JUNE 1951—MAY 1951

Products	Production		Shipments and transfers		End of month stocks	
	June 1951	May 1951	June 1951	May 1951	June 30, 1951	May 31 1951
SOYBEAN:						
Cake and meal‡	415,781	*498,736	446,817	*491,102	148,772	*179,808
Lecithin†	1,894,716	1,851,814	1,775,752	1,721,241	1,124,085	1,005,121
Edible soy flour, full fat‡	(1)	521	(1)	513	299	73
Edible soy flour, other‡	3,280	4,188	3,432	4,403	1,238	1,390
Industrial soy flour‡	1,775	2,105	1,805	2,110	413	443

* Revised. (1) Not shown to avoid disclosure of individual operations.
‡ Unit of measure in tons. † Unit of measure in pounds.

SOYBEANS: RECEIPTS, CRUSHINGS AND STOCKS AT OIL MILLS BY STATES, JUNE 1951—MAY 1951
(Tons of 2,000 pounds)

State	Receipts at mills		Crushed or used		Stocks at mills	
	June 1951	May 1951	June 1951	May 1951	June 30, 1951	May 31, 1951
U. S.	270,512	284,101	535,263	637,812	1,001,015	1,265,766
Arkansas	*	*	11,376	20,675	19,651	*
Illinois	128,799	127,104	226,087	256,533	366,563	463,851
Indiana	22,235	15,699	46,317	51,806	91,190	115,272
Iowa	51,716	45,929	86,179	102,523	161,360	195,823
Kansas	8,145	8,356	7,305	10,710	10,618	9,778
Kentucky	*	*	16,116	16,739	28,920	*
Minnesota	20,744	19,578	25,444	24,404	28,588	33,288
Missouri	*	*	18,990	24,351	*	53,549
Nebraska	*	*	4,868	5,120	*	*
N. Carolina	*	514	1,707	8,500	*	8,560
Ohio	29,415	36,226	60,458	68,978	155,331	186,374
Oklahoma	*	*	—	*	*	*
Texas	*	*	*	—	*	*
All other	9,458	30,695	30,416	47,473	138,794	199,271

* Included in "All other" to avoid disclosure of individual operations.

SOYBEAN PRODUCTS: PRODUCTION AND STOCKS AT OIL MILL LOCATIONS, BY STATES, JUNE 1951—MAY 1951

State	Crude oil (thousand pounds)				Cake and meal (tons)			
	Production		Stocks		Production		Stocks	
	June 1951	May 1951	June 30, 1951	May 31, 1951	June 1951	May 1951	June 30, 1951	May 31, 1951
U. S.	176,839	209,264	38,562	43,758	415,781	*498,736	148,772	*179,808
Arkansas	3,316	6,469	517	773	9,226	16,352	3,619	6,114
Illinois	77,793	88,568	12,137	13,628	172,819	*193,028	53,877	*56,200
Indiana	15,204	16,788	1,862	2,438	35,837	40,793	(1)	(1)
Iowa	27,669	32,654	7,422	5,270	69,966	83,964	15,789	18,925
Kansas	2,414	3,521	1,414	2,038	6,164	8,861	5,657	8,071
Kentucky	5,459	5,902	(1)	1,016	12,105	12,974	1,143	972
Minnesota	8,065	7,888	2,566	2,555	19,446	19,230	(1)	4,151
Missouri	5,807	7,089	1,363	2,477	15,812	19,938	2,752	5,244
Nebraska	1,464	1,514	420	310	(1)	4,335	(1)	(1)
N. Car.	540	2,474	220	745	1,439	6,830	10,946	14,907
Ohio	19,576	21,825	4,887	4,629	45,910	*54,976	2,282	3,087
Oklahoma	—	(1)	—	(1)	—	(1)	1,389	2,367
Texas	(1)	—	(1)	(1)	(1)	—	1,725	2,468
All other	9,532	14,572	5,754	7,879	27,057	37,455	49,593	57,302

* Revised.
(1) Included in "All other" to avoid disclosure of individual operations.
Prepared by Bureau of the Census, Industry Division, Chemicals and Wood Products Section.

● MARGARINE. Total production of colored margarine for the first four months of 1951 was 260,008,000 lbs. compared to 102,055,000 lbs. in the same period of 1950, reports Bureau of the Census.

Production of the uncolored product for the first four months of 1951 totaled 94,828,000 lbs. compared to 212,613,000 lbs. during the same months of 1950.

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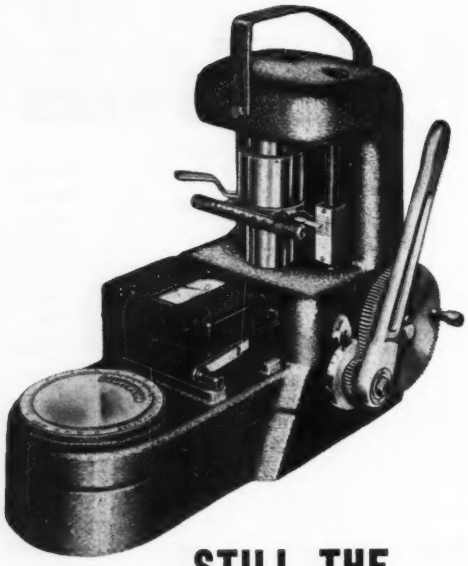

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● **EXPORTS.** U. S. exports of soybeans and soybean oil for June and for the six months, January-June 1951, as reported by the Office of Foreign Agricultural Relations, U. S. Department of Agriculture:

Commodity	June	January-June
Soybeans (bushels)	1,825,478	16,016,228
Soybean oil, crude (pounds)	41,763,100	147,990,604
Soybean oil, refined (pounds)	36,809,412	94,930,147

The January data on exports of crude soybean oil have been revised upward from 13,566,865 to 15,706,710 pounds.

Converted to a soybean equivalent basis, the exports for June amounted to 10,085,300 bushels of beans and January-June to 41,437,100 bushels.

Total exports from the United States of fats, oils and oilseeds, oil equivalent, during June were about 45 percent larger than in June 1950 and brought the January-June accumulation to 1,140.6 million pounds, or almost 90 million pounds more than in the comparable period of 1950.

January-June soybean exports were more than double those of the comparable period of 1950 and refined soybean oil shipments were over three times last year's, but crude oil decreased by 2 million pounds. Lard exports increased from the first half of 1950 by 15 percent and inedible tallow by 10 percent.

These gains were partially offset, however, by sizeable decreases in exports of other commodities—in addition to crude soybean oil.

● **INSPECTIONS.** Inspected receipts of soybeans in June were somewhat above the preceding month and above average, according to reports to the Department of Agriculture. Inspections totaled 4,801 cars in June compared with 4,210 in May, 3,634 in June 1950 and 3,260 the June average of 1941-49. Inspected receipts for October through June this season amounted to 114,892 a year ago and 93,703 the same months of 1948-49.

The quality of the soybeans marketed in June continued good, 85 percent grading No. 2 or better compared with 86 percent in May, 74 percent in June 1950 and 67 percent the 10-year June average.

Inspections of soybeans in June included the equivalent of 338 cars inspected as cargo lots and 164 cars as truck receipts.

● **SHORTENING.** Standard shortening shipments reported by the Institute of Shortening and edible oils, Inc., in pounds.

Week ending July 28	4,287,339
Week ending Aug. 4	4,480,600
Week ending Aug. 11	5,038,479
Week ending Aug. 18	5,573,651
Week ending Aug. 25	5,011,217

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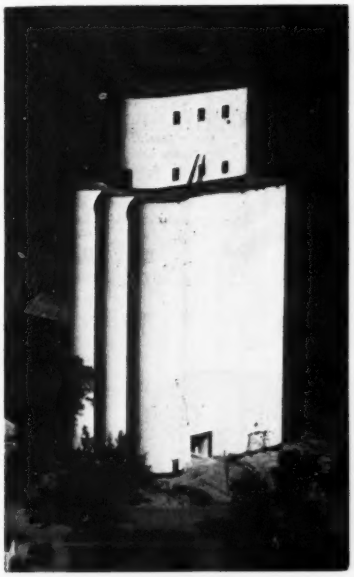

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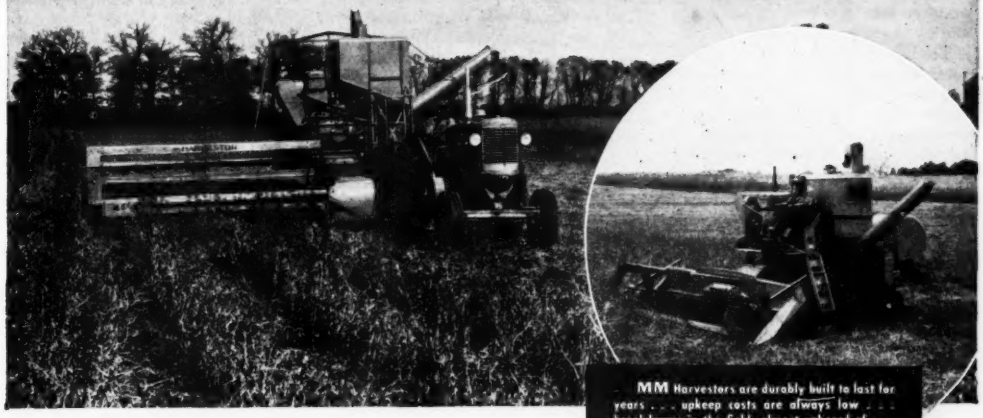

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To those of us who are dairy farmers, or in allied work, it may appear a little superfluous to single out one month as Dairy Month. Actually every month is Dairy Month, because dairying is a year around business.

Our customers, however, need a June Dairy Month. Because of the regularity of our work and service to America, the average consumer is prone to take our product, our work, and our service for granted.

To overcome this lethargy and to continue to build the appreciation and acceptance of dairy foods, the entire dairy industry once a year concentrates all of its forces in awakening the consuming public to a greater appreciation of our most perfect food and its role in building a stronger, healthier, happier America.

Heading up our month of tribute, appreciation, and promotion are the National Dairy Council and the American Dairy Association. The National Dairy Council works primarily in the fields of education and research. The American Dairy Association works in the fields of advertising, merchandising, promotion, public relations, and research.

As the merchandising voice of the American dairy farmer, the American Dairy Association has, over the past 10 years, developed steadily and constructively. Last year dairy farmers throughout the United States agreed to deductions from their milk checks during the month of June which, in total, accumulated a fund of over $1,300,000. Of this amount, approximately $900,000 went to direct advertising, $165,000 to research and education, $60,000 to merchandising, $70,000 to publicity, $70,000 to industry promotion, $85,000 to administration, and approximately $9,000 to other activities.

This seems to us, individually, to be a tremendous sum of money. It is. On the other hand, when you appreciate that one full-page color advertisement in a national consumer magazine may cost as much as $25,000, we can understand why large sums of money are required to do an effective job of selling more dairy foods, expanding our markets, and increasing the prices we receive from milk and cream.

It is significant to note that every major industry, whether it be automobiles, soft drinks or other allied foods, spends many times as much as the dairy industry spends on advertising, merchandising, and promotion of its products.

The average American dairy farmer contributes approximately $5 to the American Dairy Association program of greater sales. Most contributions are based on a deduction of one cent per pound of butterfat during the month of June. This year a nationwide effort is being made to extend the period of deduction from one to two months. We believe this is a desirable development and in keeping with the growing awareness of the industry that our markets must be preserved and expanded if the best prices are to be realized from the products we sell.—*Hoard's Dairyman.*

THE PRESS

We won't try to make any comparisons between the size, effort and finances the dairymen are putting into their public relations program and what the soybean industry is doing. It would make us blush!—EDITOR.

LETTERS

Word from Fairchild

TO THE EDITOR:

If you will let me know beforehand when you would like to have a talk about those days before Americans knew much about the soybeans and a small group of us were pitching into the study of them, I shall be very glad to help you all I can.

There will be several most interesting characters concerned and I believe you could make a story with what data I have that will interest the members of your large association. I know of no other plant introduction from one large country to another which has as much romance about it.

Some day your association will publish a book about the great accomplishments of your members and the tremendous changes which the soybean has made in the agriculture of North America.—*David Fairchild, Coconut Grove, Fla.*

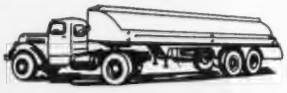
Dr. Fairchild, retired senior agricultural explorer of the U. S. Department of Agriculture and well known author, took part in the first work with soybeans in USDA. See his "Early Experiences with the Soybean" in Nov. 1948 Soybean Digest. —EDITOR.

He's Complimentary

TO THE EDITOR:

You have a very fine magazine. Don't see how you manage to do it for the price. I go through it like a worm in a big fat apple. Sometimes takes two or three weeks as my reading time is limited.

Sometimes I review Editor's Desk and Washington Digest three or four times.—*M. B. Biggs, New London, Mo.*

Ship By 

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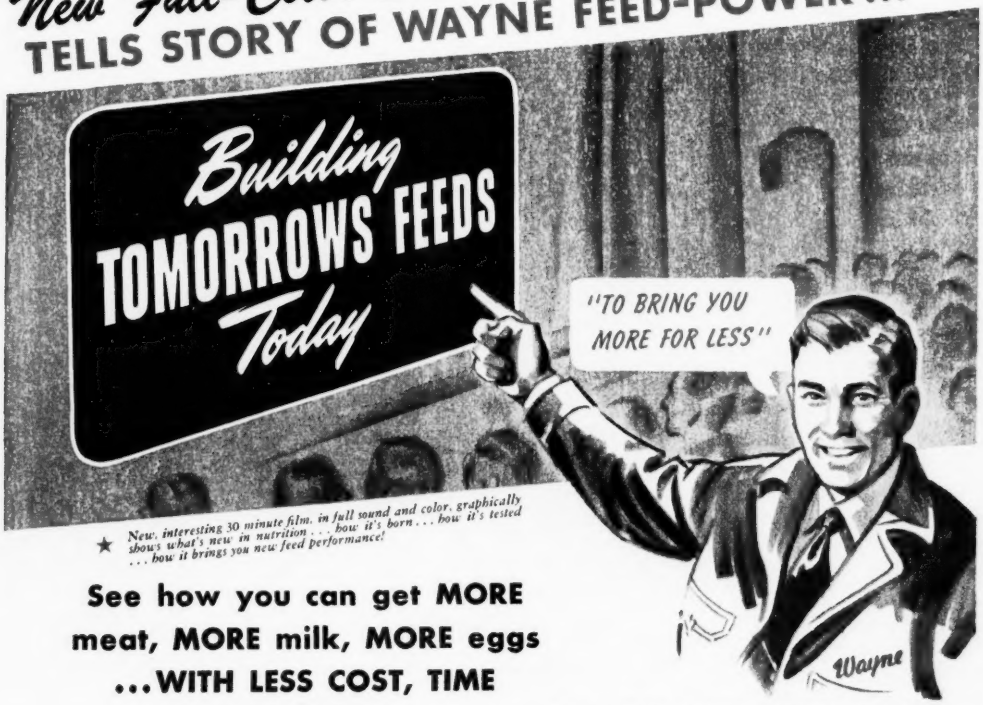

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